



# ***UltraNavGPS***

## **INSTALLATION AND OPERATION INSTRUCTIONS**

LITHO IN U.S.A.

988-0106-61

# EAGLE

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**WARNING!**

USE THIS GPS RECEIVER ONLY AS AN AID TO NAVIGATION. A CAREFUL NAVIGATOR NEVER RELIES ON ONLY ONE METHOD TO OBTAIN POSITION INFORMATION.

**CAUTION**

This GPS receiver, (like all GPS navigation equipment) will show the shortest, most direct path to a waypoint. It provides navigation data to the waypoint regardless of obstructions. Therefore, the prudent navigator will not only take advantage of all available navigation tools when travelling to a waypoint, but will also visually check to make certain a clear, safe path to the waypoint is always available.

**NOTICE!**

As of this writing, the Department of Defense (DOD) has not declared the GPS navigation system as operational. The system is still in a testing phase. Satellites can be turned off or accuracy can be degraded at will by the system operators. Remember that the UltraNavGPS, or any GPS receiver is only as accurate as the system it's using.

Features and specifications subject to change without notice.

All display screens in this manual are simulated.

## NOTES:

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**NOTES:**

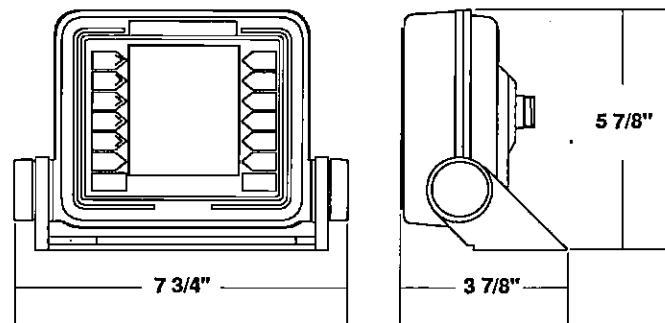
## NOTES:

### INTRODUCTION

The UltraNavGPS represents one of the best values in sportfishing sonar today. It rivals other sonar units costing much more in features and performance. With its menus, the UltraNavGPS offers easy-to-use operation at the touch of a button. The screen shows the underwater world with high resolution and detail. The UltraNavGPS also displays digital depth, boat speed, surface water temperature, and distance travelled (distance log) if the optional speed/temperature sensor (model ST-T) is attached.

Although the UltraNavGPS has many features and functions, the "soft key" menu system makes it easy to use. Above all, don't be afraid to try different features and functions on the unit. You can't hurt it by pressing buttons!

Read this manual and take it with you the first few times you use your unit. It makes a great reference should you need it. The more you know when you get to the water, the more your UltraNavGPS can do for you!



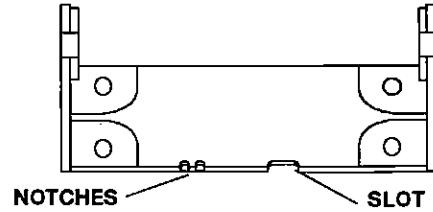
### MOUNTING

Install the UltraNavGPS in any convenient location, provided there is clearance behind the unit when it is tilted for the best viewing angle. Holes in the bracket base allow wood screw or through-bolt mounting. You may need to place a piece of plywood on the back of thin fiberglass panels to secure the mounting hardware. Make certain there is enough room behind the unit to attach the power and transducer cables.

The smallest hole that will pass one power or transducer plug is one inch. After the hole is drilled, pass the transducer connector up through the hole first, then pass the power cable down through it.

## NOTES:

After the cables have been routed, fill the hole with a good marine sealing compound. Offset the bracket to cover the hole. Route the power cable through the slot and break out one of the other slots in the bracket for the transducer cable.



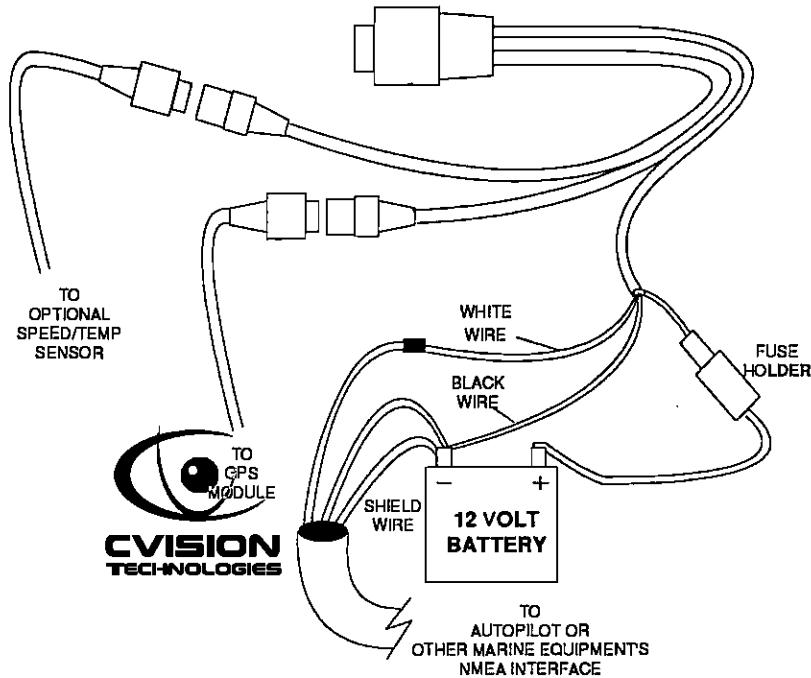
## POWER CONNECTIONS

The UltraNavGPS works from a twelve-volt battery system only. For the best results, attach the power cable directly to the battery. You can attach the power cable to an accessory or power buss, however you may have problems with electrical interference. Therefore, it's safer to go ahead and attach the power cable directly to the battery. If the cable is not long enough, splice #18 gauge wire onto it. Attach the in-line fuse holder to the red lead as close to the power source as possible. For example, if you have to extend the power cable to the battery or power buss, attach one end of the fuse holder directly to the battery or power buss. This will protect both the unit and the power cable in the event of a short.

The power cable has three wires, red, white, and black. Red is the positive lead, black is negative or ground. The white wire is used for the NMEA interface. To use this feature, attach a shielded, twisted pair cable from the autopilot or other marine equipment's NMEA interface to the white wire on the UltraNavGPS's power cable. Solder the twisted pair's ground wire and shield wire to the black wire on the UltraNavGPS's power cable. Do not connect the shield wire to the autopilot. See your autopilot's manual for more instructions. If you're not going to use this feature, cut and tape the white wire to prevent shorts.

The UltraNavGPS has reverse polarity protection. No damage will occur to the unit if the power wires are hooked up backwards. However, it won't work until the wiring is connected properly.

## NOTES:



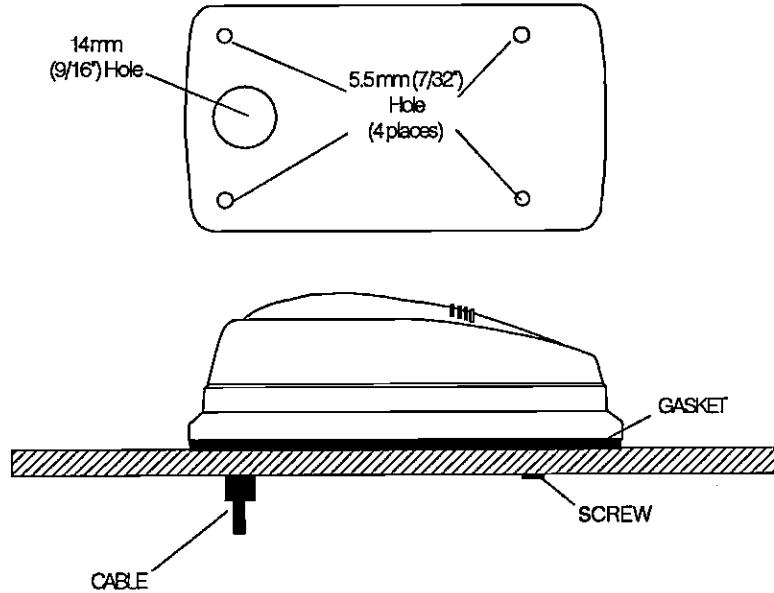
Attach the GPS module's cable to the UltraNavGPS's power cable. Tags on the cables identify both the GPS and the optional speed/temperature sensor's connector. See the GPS section in this manual for GPS module installation.

## GPS MODULE INSTALLATION

The GPS module can be installed on a flat surface or (with the supplied adapter) on a pole. Mount the module in an area that guarantees a clear view of the sky at all times. In order for the module to receive the signals from the satellites, it must not be obstructed. An ideal location is on a cabin roof, or deck. The gunnels also make a good location. Attaching the pole mounting adapter lets you install the module on a one inch mast. A high location is preferred. However, for lightning protection, the antenna shouldn't be the highest part of the boat.

### Surface Mounting - With Access

If you have access underneath the mounting surface, use the gasket furnished with the GPS module as a template. Mark and drill four 5.5mm (7/32") holes for the mounting screws and one 14 mm (9/16") hole for the module's cable. Attach the cable to the module and pass it down through the hole in the gasket and the mounting surface. Use four 5 mm screws, flat washers, and lock washers to fasten the GPS module to the mounting surface. Route the 25' GPS cable to the UltraNavGPS.



### Surface Mounting - Without Access

If you don't have access to the back side of the mounting surface, use the "cleats" supplied with the UltraNavGPS. (Note: This is assuming you can "snake" the module's cable to a location that is accessible. A hole will still need to be drilled in the mounting surface for the cable.) Using the gasket as a template, mark and drill the 9/16" hole for the cable. Attach the cable to the module and drop the other end of the cable through the gasket and down the hole. Place the module on the gasket. Slide the "cleats" onto each end of the module and (using the cleats as templates) mark four holes for 5 mm (#10) mounting screws. Drill the holes, then replace the cleats on the module and fasten them to the mounting surface with 5 mm (#10) screws. Route the cable to the UltraNavGPS.

## ULTRANAVGPS SONAR SPECIFICATIONS

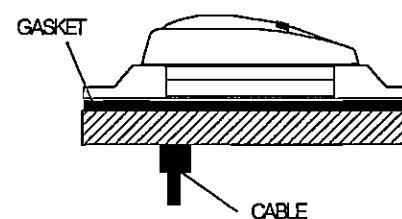
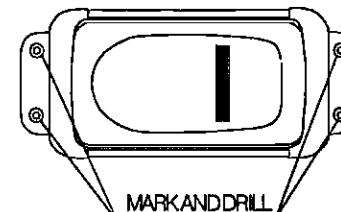
UltraNavGPS Dimensions	5.875"H x 7.75"W x 3.875"D
Input Voltage	10-15 vDC
Current	500 ma (lights off) 650 ma (lights on)
Transmitter	
Frequency	192 kHz
Output Power (typical)	600 watts (peak-to-peak) 75 watts (RMS)
Display Size	3.1"H x 2.4"W
Pixels	128 H x 80 W 10,240 Total

## ULTRANAVGPS GPS RECEIVER SPECIFICATIONS

GPS Module Dimensions	2.5"H x 4.1"W x 7" D
Channels	Five Parallel
Update rate	Four continuous for position
	All satellites in view tracked
Accuracy	One second
Position:	Maximum accuracy achievable with
Velocity:	Standard Positioning Service
	25 meters CEP
	0.25 meters/sec RMS
	Without SA PDOP<6.0

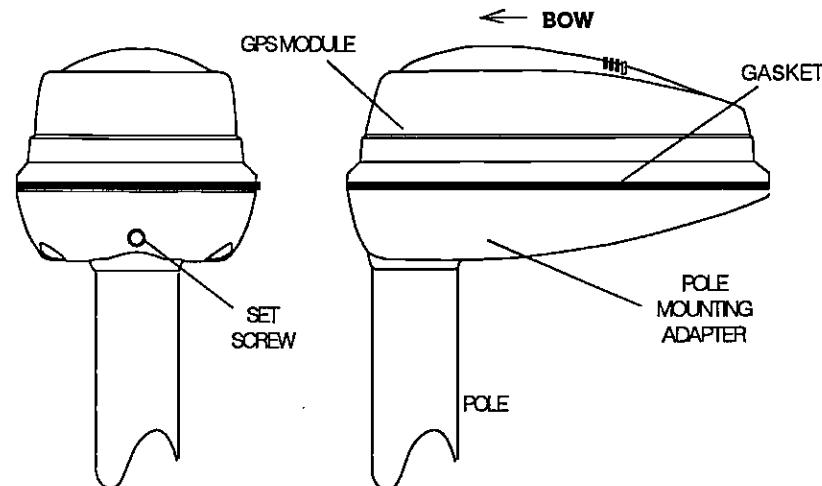
## NMEA 0183 SENTENCES

RMB	Minimum Recommended Sentence, Part B
RMC	Minimum Recommended Sentence, Part C
GLL	Present Position - Latitude/Longitude
APA	Autopilot Steering Data
DBK	Water Depth
MTW	Water Temperature (oC)
VHW	Speed Through Water (KPH)
VLW	Distance Travelled/LOG (NM)



### Pole Mount

First, thread the pole mounting adapter onto the mounting pole or ratchet base. Align the pole mounting adapter so the module will face the bow of the boat. Install and tighten the set screw into the pole mounting adapter and tighten it securely. This should prevent the GPS module from unscrewing from the pole. Place the gasket onto the pole mounting adapter. Now attach the cable to the GPS module and pass the cable through the gasket, pole mounting adapter, and pole. Set the GPS module on top of the pole mounting adapter and align the four threaded holes in the module with the holes in the pole mounting adapter. Using the four stainless steel 5 mm screws and lock washers supplied with the UltraNavGPS, attach the pole mounting adapter to the GPS module. This completes the assembly.

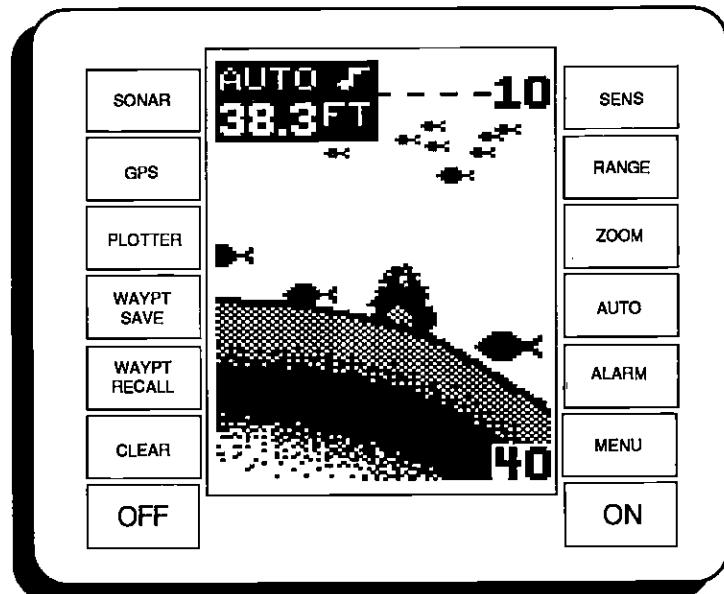


## TRANSDUCER CONNECTIONS

See the transducer owner's manual included with the unit for transducer installation instructions.

## KEYBOARD

The keyboard has keys arranged in two vertical columns. The keys in the left column are used to switch the unit between sonar, GPS, and plotter modes, plus menu selections. The keys in the right column pertain to the basic sonar functions. The menu key in the bottom right corner of the keyboard activates the first menu page.



SENS - Press this key to adjust the unit's sensitivity and Grayline.

RANGE - This key lets you adjust the range when the unit is in the manual mode.

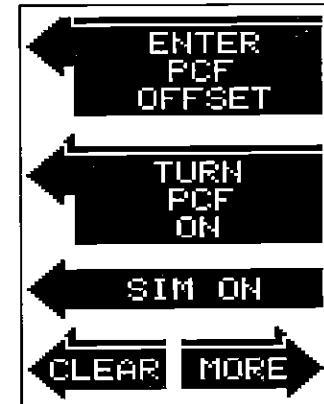
ZOOM - The Ultra gives you 2X and 4X zoom capability with this key.

AUTO - This turns the automatic feature off and on.

ALARM - Activate and adjust the alarms through this key.

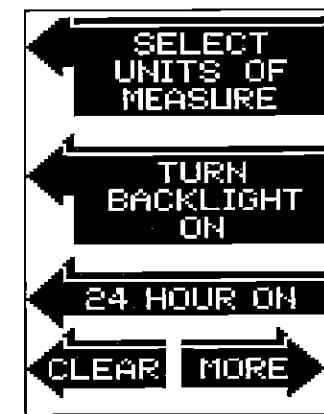
MENU - Press this key to show the menus and gain access to most functions.

To turn the simulator on, press the MENU key, then press the key adjacent to the "CHANGE SETUP" label. Now press the key next to the "MORE" label until the screen shown below appears. Press the key next to the "SIM ON" label. The simulator mode starts immediately. To turn the simulator off, either press and hold the OFF key or repeat the above steps to get the menu shown below. The label now reads "SIM OFF". Press the key adjacent to that label.



## TIME FORMAT

The UltraNavGPS' time format can be either 12 hour (AM or PM) or 24 hour (2:00 pm = 14:00). When the unit is first turned on, or after it's preset, the time format is 12 hour. To change to 24 hour format, press the MENU key, then press the key adjacent to the "CHANGE SETUP" label. Now press the key next to the "MORE" label until the "24 HOUR" label appears. Press the key next to that label. The UltraNavGPS will show the time in 24 hour format on all screens with a time display. To switch back to 12 hour format, repeat the above steps. The menu now says "12 HOUR ON". Press the key adjacent to that label for 12 hour format.

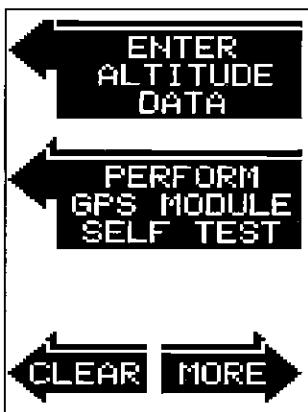


## GPS MODULE SELF-TEST

This feature tests the GPS module and returns a special code. This code is of interest only to the service department. However, the UltraNavGPS interprets this code and displays a status message, either "MODULE PASSED" or "MODULE FAILED". The current software version number also appears at the bottom of the screen. Contact the factory customer service department if the module fails the self test.

To use the self test feature, press the MENU key, then press the key adjacent to the "CHANGE SETUP" label. Now press the key next to the "MORE" label until the menus shown below left appear. Finally, press the key adjacent to the "PERFORM GPS MODULE SELF TEST" label. The screen below right appears.

To exit from this screen, press the CLEAR key.



SELF TEST  
W6. .... 0000  
W7. .... FFFF  
W8. .... FFFF  
W9. .... 0000  
W10. .... FFFF  
W11. .... 0000  
W12. .... 0000  
W13. .... 0000  
  
GPS PASSED  
MODULE  
SOFTWARE  
VER 1.2

## GPS SIMULATOR

This feature places position and navigation data on all screens, including the plotter. The unit "navigates" a closed course. It shows bearing and distance to go, course over ground, and other information. A recurring message appears, alerting you to the fact that the simulator mode is enabled. Don't navigate when the simulator is on!

ON - The ON key turns the Ultra on.

OFF - Press and HOLD the Off key to turn the UltraNavGPS off.

SONAR - This key switches the UltraNavGPS from the GPS mode to the sonar mode.

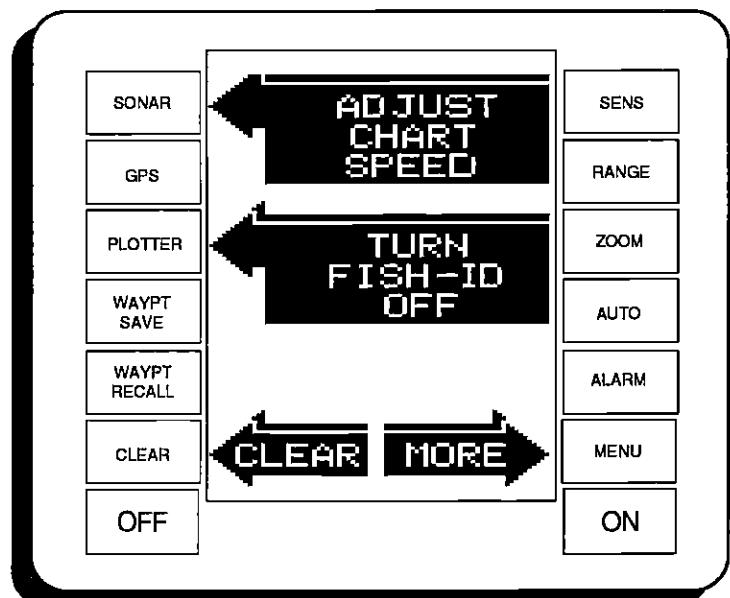
GPS - Press this key to switch to the GPS mode.

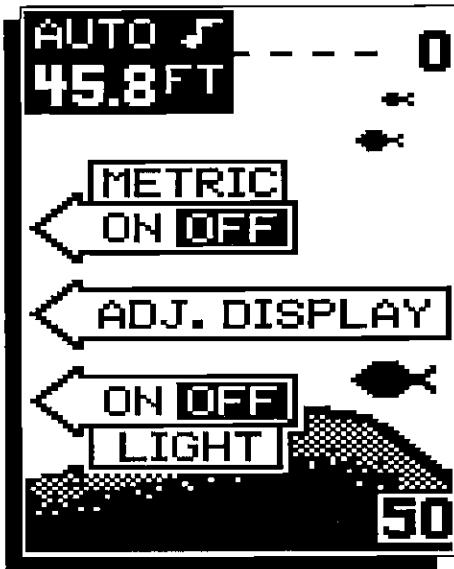
PLOTTER - The plotter appears when this key is pressed.

WAYPT SAVE - Press this key to save a waypoint.

WAYPT RECALL - This key activates the waypoint recall menus.

Note: The Sonar, GPS, Plotter, Waypoint Save and Waypoint Recall keys are also used as "soft keys" or feature select keys. When a menu selection arrow points to one of these keys, the key activates the menu feature, not the feature printed on the key. For example, if you press the PLOTTER key as shown below, the Fish ID feature will be turned off.





## DISPLAY - General

The lights are turned on for approximately ten seconds when the UltraNavGPS is first turned on. Menus appear at the same time. To keep the lights on, press the key adjacent to the Light label. It controls the backlighting used on the display and keyboard. If you don't want the lights on, wait ten seconds and the lights will automatically turn themselves off. The menus will also disappear after ten seconds, or you can turn them off by pressing the key adjacent to the CLEAR key at the bottom of the screen.

The Metric label at the top of the screen works the same way. Press the key adjacent to the Metric label to change the depth from feet to meters. This also changes the temperature display to degrees Celsius, speed to knots, and log to kilometers on the UltraNavGPS.

The ADJ Display label lets you adjust the display's contrast for the best viewing angle. Pressing this key gives you the contrast adjust menu. See the Display Contrast section for more information on this feature.

When the UltraNavGPS is first turned on, the display will appear similar to the one above. The word "AUTO" in the upper center of the display indicates the automatic feature is on. A small note symbol next to the "AUTO" indicator means the alarm speaker is enabled. The digital bottom depth is displayed immediately beneath the AUTO indicator.

## SELECT UNITS OF MEASURE

TURN BACKLIGHT ON

SET SPEAKER VOLUME

ADJUST DISPLAY CONTRAST

These menus are duplicates of the ones found in the sonar menus. See the sonar section for more information on these features.

## MAN OVERBOARD

One of boating's most terrifying events is having a friend or family member fall overboard. This situation can be deadly on any body of water, fresh or salt. It's particularly dangerous at night or if you're out of sight of land. Of course, the first thing to do is remain calm and try all standard safety measures to try and rescue the person. If you lose sight of the person, you can use the UltraNavGPS to initiate a search pattern.

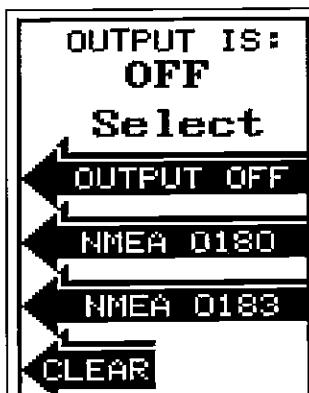
Once you're back at the helm after initial rescue efforts have failed, press the UltraNavGPS' Waypoint Quicksave key. This instantly stores your present position in memory. Now press the Waypoint Recall key. The position you just saved is displayed on the screen. Now press the key adjacent to the "ENTER" label. This recalls the waypoint you stored, causing the UltraNavGPS to show navigation information back to that waypoint. The Arrival alarm will sound since you're within its radius, either ignore it or press the CLEAR key to silence it.

Using the unit in this manner lets you start a search pattern for the victim from a known location. Switching to the plotter on the .05 mile range makes it easier to see your position relative to the accident area.

Remember, saving the victim is the primary goal. Try all options to rescue the person immediately after the accident happens. Training and education are also good accident preventatives. The Coast Guard has excellent safety courses. Instruct all members on board your boat on safety procedures before leaving the dock. Make certain all on board know what to do before any emergency occurs.

## NMEA COMMUNICATION

The UltraNavGPS sends data out the white wire on the power cable according to standards set by the NMEA (National Marine Electronics Association). This allows the UltraNavGPS to send position, depth, and navigation information to "listener" units, such as charting instruments, autopilots, and other marine instruments. The UltraNavGPS uses the following NMEA data protocols: NMEA 0180 and 0183. NMEA 0180 sends steering information only. It's useful mainly for autopilots. NMEA 0183 sends depth, position, steering, speed, and more. In order to use this feature, the white wire on the power cable must be connected to the NMEA data input on the other instrument. See the installation section in this manual for wiring connection information.



NMEA SELECTION SCREEN

Once the wiring is connected properly, the UltraNavGPS must be told which data format to use. Consult the owner's manual of the "listener" equipment to see which format it needs. Then set the UltraNavGPS as follows: First, press the MENU key while a GPS or plotter screen is displayed. Next, press the key next to the "Change Setup" label. Now press the key adjacent to the "More" label until the "SELECT NMEA OUTPUT" label appears. Press the key next to this label. The screen shown above appears.

The data format currently in use shows at the top of the screen. Press the key adjacent to the desired data output. The UltraNavGPS will return to the last used GPS or plotter screen, and send NMEA data out the white wire on the power cable.

## PRESET

The Preset feature returns all sonar and GPS units to their original factory settings. This resets the units of measure, speaker volume, automatic mode on the sonar side, display contrast, and more. This doesn't erase any waypoints or routes, however.

To preset the unit, press the MENU key until the "PRESET UNIT" label appears. Press the key adjacent to that label. The menu screen disappears and the UltraNavGPS returns to the GPS position screen. All units will be returned to their factory settings.

## SONAR OPERATION

### AUTOMATIC

When the UltraNavGPS is first turned on, the Automatic feature is enabled. This is indicated by the word "AUTO" at the top of the screen. The Automatic feature adjusts the sensitivity and range so the bottom signal is displayed in the lower half of the screen at all times.

To turn Automatic off, simply press the AUTO key. The letters "Man" appears, indicating the unit is in the manual mode. To turn Automatic on, press the AUTO key again.

AUTOMATIC MODE ON



### SENSITIVITY

The sensitivity key on the UltraNavGPS controls the ability of the unit to pick up echoes. A low sensitivity level excludes much of the bottom information, fish signals, and other target information. High sensitivity levels enable you to see this detail, but it can also clutter the screen with noise. Typically, the best sensitivity level shows a good solid bottom signal with Grayline and some surface clutter.

When the UltraNavGPS is in the Automatic mode, the sensitivity is automatically adjusted to keep a solid bottom signal displayed, plus a little more. This gives it the capability to show fish and other detail.



However, situations occur where it becomes necessary to increase or decrease the sensitivity. This typically happens when you wish to see more detail, so an increase in sensitivity is indicated. The procedure to adjust it is the same whether the unit is in the automatic or manual mode.

To adjust the sensitivity, press the SENS key. The sensitivity adjust menu appears on the left side of the screen. The switch for the Grayline adjust menu is immediately beneath it.

The sensitivity menu has up and down arrows, plus a vertical bar graph. The graph gives a visual indication of the sensitivity level. The number above the up arrow also shows the percentage of sensitivity in use.

To increase the sensitivity level, press the key adjacent to the menu's up arrow on the left side of the unit. As you press the key, the menu's bar graph will grow taller and the percentage will increase in value. You can also see the difference on the chart record as it scrolls. When the sensitivity is at the desired level, release the key.

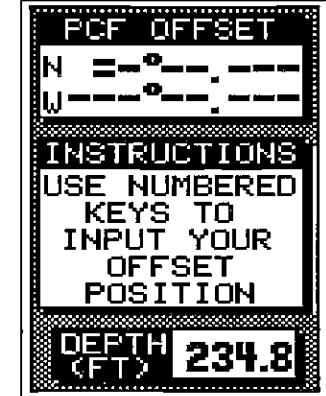
To decrease the sensitivity level, press the key adjacent to the down arrow. The bar graph and percentage will decrease. When the sensitivity is at the desired level, release the key.

When you reach either the maximum or minimum limit, the speaker will sound an alert tone.

To turn the menus off, press the key adjacent to the CLEAR key at the bottom left side of the unit.

For example, suppose you are anchored at a location that is accurately marked on a chart. Your UltraNavGPS displays a longitude position that is .010 degrees less than the one on the chart. Using the Position Correction Factor (PCF) Offset feature, you make the UltraNavGPS read the same as the chart. If you raise anchor and move, the UltraNavGPS will add the change you made to all positions. This makes it more closely match the datum used by the chart. For this reason, you should be careful when entering the PCF Offset. This is saved in memory. It does not change when the unit is turned off.

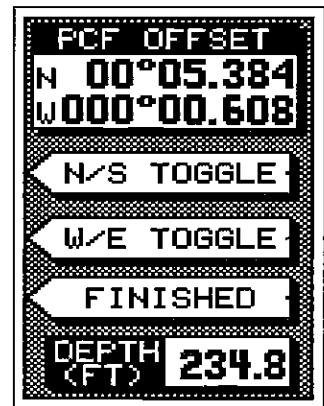
To use the PCF Offset, first subtract your current position from the location on the chart you wish to match. For example, if your location is N32°10.220', W80°12.106' and the chart's position is N32°15.604', W080°12.714', then the position offset is N 00°05.384', W 00°00.608'. Press the MENU key, then press the key adjacent to the "CHANGE SETUP" label. Now press the key adjacent to the "MORE" label until the "ENTER PCF OFFSET" label appears. Press the key adjacent to that label. The screen shown at right appears.



1st PCF ENTRY SCREEN

Now enter the difference between your position and the chart's location in latitude and longitude. The screen shown below appears next.

Press the keys adjacent to the N/S or E/W Toggle labels to switch the latitude and longitude to south or east, respectively. When the position at the top of the screen is correct, press the key adjacent to the "Finished" label. The UltraNavGPS now adds the correction factor to all position displays.



2nd PCF ENTRY SCREEN

## CHANGING STARTUP SETTINGS

The UltraNavGPS must be initialized when it's turned on for the first time. This is described at the beginning of the GPS section in this manual. However, if you wish to change only one of the parameters (such as time), use the menu features in the "CHANGE SETUP" menu. To do this, press the MENU key, then press the key adjacent to the "CHANGE SETUP" label. The screen shown below appears.

Using the menus on this and following menu pages, you can change the Initial Position, Time-Date-Time Offset, or Altitude without affecting any other initialization setting. All of these menus work identically to the ones described in the initialization section at the beginning of the GPS section. After you make a change, the unit returns to the GPS or plotter screen, however. It doesn't automatically sequence through the initialization menus. For example, if you move a long distance (over 100 miles) with the unit off, you may want to enter a new initial position to help the UltraNavGPS find the correct position quicker.



## PCF OFFSET

### (Position Correction Factor)

The GPS navigation system relies on complex mathematical calculations to determine your position based on satellite data and other factors. One factor is the Earth's shape. Since the Earth is not a true sphere, variations in the calculations have to be made to accommodate deviations. To make matters more complex, not everyone uses the same data to determine what the deviations are. The size and shape of the ellipsoids that are used to approximate the earth's surface are improved often. This can lead to errors if your navigation device uses one ellipsoid, while your chart uses a different one. The term used for these ellipsoids is "datum."

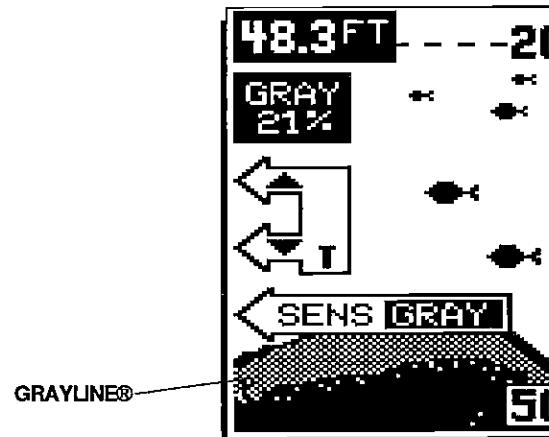
To reduce the error factor between datum, the UltraNavGPS gives you the capability to move or "offset" the position shown on the display to match one shown on the chart. The unit adds this offset to all position displays.

## GRAYLINE®

GRAYLINE® lets you distinguish between strong and weak echoes. It "paints" gray on targets that are stronger than a preset value. This allows you to tell the difference between a hard and soft bottom. For example, a soft, muddy or weedy bottom returns a weaker signal which is shown with a narrow or no gray line. A hard bottom returns a strong signal which causes a wide gray line.

If you have two signals of equal size, one with gray and the other without, then the target with gray is the stronger signal. This helps distinguish weeds from trees on the bottom, or fish from structure.

GRAYLINE® is adjustable. Since GRAYLINE® shows the difference between strong and weak signals, adjusting the sensitivity may require a different GRAYLINE® level, also. The level chosen by the UltraNavGPS at power on is usually adequate for most conditions. Experiment with your unit to find the GRAYLINE® setting that's best for you.



To adjust GRAYLINE®, press the SENS key. The sensitivity menu appears in the upper left side of the display, while the GRAYLINE® switch label appears immediately beneath it. First press the key adjacent to the "SENS GRAY" label. This changes the sensitivity adjust menu to GRAYLINE® adjust. Now press the key adjacent to the up arrow to increase the gray level. Press the key adjacent to the down arrow to decrease it. The percentage of GRAYLINE® in use changes as the arrow keys are pressed. The bar chart also gives a graphical indication of the GRAYLINE® level. You can see the change on the screen (both on the menu and on the chart record) as you press the keys. After you've made the adjustment, press the CLEAR key to erase the menu.

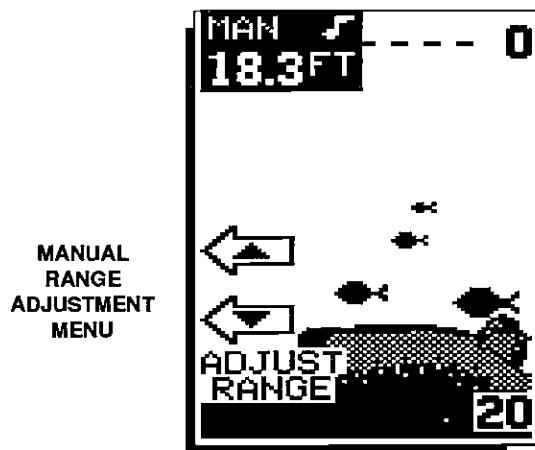
## RANGE - Automatic

When turned on for the first time, the UltraNavGPS automatically places the bottom signal in the lower half of the screen. This is called Auto Ranging and is part of the automatic function. The range cannot be changed manually while the unit is in automatic.

## RANGE - Manual

The UltraNavGPS gives you control over the range when it's in the manual mode. Both the lower and the upper limit are adjustable.

To change the range, first make certain the UltraNavGPS is in the manual mode. If necessary, press the AUTO key to switch to the manual mode. Next, press the RANGE key. Two arrows appear in the lower left corner of the display. These are the range adjust arrows. Press the key corresponding to the upper or lower arrow to decrease or increase the range. The available ranges are 0-10, 20, 40, 60, 100, 150, 200, 300, 500, 900 feet. After the desired range is displayed, press the CLEAR key to erase the range arrows.



**NOTE:** The depth capability of the UltraNavGPS depends on the transducer installation, water and bottom conditions, and other factors. You can expect to read depths in excess of 350 feet in both fresh and salt water.

left. The satellite number (SAT) in use by the channel shows to the right of the channel number. Azimuth is the direction of the satellite from your present location. Elevation is the height of the satellite above the horizon. SIG is the signal-to-noise ratio. The higher the SNR, the better. Channel status has three possible modes: Idle (-), Searching (S), or Tracking (T). If the channel is not using a satellite, then it is idle and dashed lines appear in the displays for that channel. If it is searching for the satellite, the (S) appears. Once it's locked on to the satellite, then the (T) appears. The example screen on the previous page has channels 1,2, and 4 tracking, 3 is searching, and 5 is idle.

Beneath the Satellite Info display is the list of satellites that are visible from your location. They are listed by their satellite number.

To exit from the satellite info screen, press the CLEAR key.

## ENGINEERING SCREEN

The UltraNavGPS lets you view the Dilution of Precision for the horizontal (HDOP), geometric (GDOP), vertical (VDOP), position (PDOP), and time (TDOP). These are displayed on the Engineering Screen.

To view this screen, press the MENU key three times. Now press the key adjacent to the "ENG SCREEN" label. The screen shown below appears.

GDOP stands for Geometric Dilution Of Precision. This is a crossing angle indicator. It shows the combination value of horizontal (HDOP), vertical (VDOP), and Time (TDOP). The smaller the GDOP number is, the better the crossing angles are. The GPS receiver selects satellites based on GDOP, therefore it always tries to use satellites that will result in good crossing angles. The best way to use GDOP is to anticipate system problems. In other words, if the crossing angles are decreasing, then the satellites could be moving out of your viewing range. Therefore, the system may become unusable if more satellites don't appear shortly.

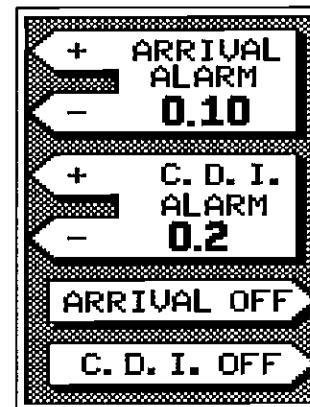
HDOP	<b>2.37</b>
GDOP	<b>3.83</b>
VDOP	<b>2.41</b>
PDOP	<b>3.38</b>
TDOP	<b>1.79</b>
UTC OFFSET	<b>05:00</b>

Above the GDOP display is the HDOP display. This shows the 2D, horizontal crossing angle. Again, the smaller the number is, the better the crossing angles are. Typically, 1-4 is good, 5-10 is fair, and anything over 10 is poor for all displays on this page. The UTC OFFSET is the difference between your local time and UTC (GMT).

## CDI Alarm and Range

Changing the CDI alarm also changes the CDI range on the steering screen. To change the CDI alarm settings, first press the MENU key. Then press the key adjacent to the "GPS ALARMS" label. This screen appears.

The CDI alarm adjustment menu is in the middle of the screen. Press the key adjacent to the up or down arrow to increase or decrease the CDI alarm. The alarm is adjustable from 0.0 to 9.9 miles.



After setting the alarm to the desired range, press the key adjacent to the "C.D.I. OFF" label. This turns the CDI alarm on. If you merely wish to set the CDI range without using the alarm, leave the CDI alarm off.

The CDI Alarm sounds a tone when your cross track error is more than the alarm setting. For example, suppose the CDI alarm is set to 0.1 nautical mile. If you move to the left of course by more than 0.1 nautical mile, the CDI alarm sounds an alert tone.

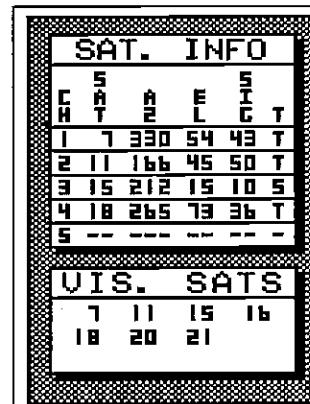
After you've finished with the settings on this page, press the CLEAR key to return to the GPS screen.

## SATELLITE INFORMATION SCREEN

The Satellite Information screen shows technical data about each satellite in the viewing range. Up to 5 satellites can be used by the UltraNavGPS at one time. To view the satellite data, press the MENU key two times, then press the key adjacent to the SATELLITE INFO SCREEN. The screen shown at right appears.

This screen shows the following information: channel number (CH), satellite number (SAT), azimuth (AZ), elevation (EL), signal-to-noise ratio (SIG), channel status and visible satellites.

The UltraNavGPS has a five-channel receiver. The channel number appears at the display's



SATELLITE INFO. SCREEN

## ZOOM

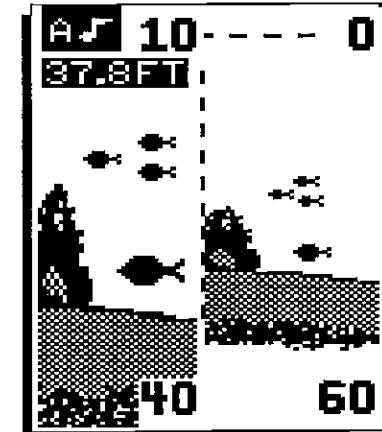
Enlarging or "zooming" the picture is a common method used to show small detail and fish signals. The UltraNavGPS gives you two different zoom sizes, plus a split screen zoom option. The zoom operation and adjustment is different in the automatic and manual modes.

### ZOOM - AUTOMATIC MODE

To zoom the display in the automatic mode, first press the ZOOM key. All targets on the display are enlarged four times normal size automatically. The menus shown below also appear.



FULL SCREEN ZOOM



SPLIT SCREEN ZOOM

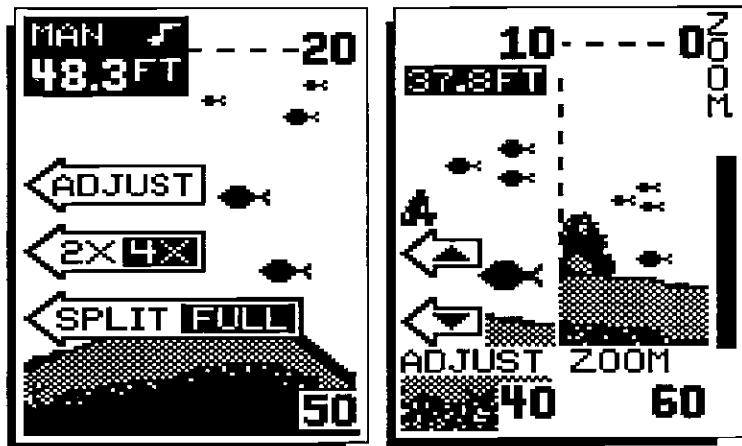
Pressing the key adjacent to the "2X/4X" label switches echoes between two times and four times their normal size.

To switch between the split screen zoom and full screen zoom, press the key adjacent to the "SPLIT/FULL" label. The screen instantly splits into two sections. All targets on the left are shown at four times the size of the ones on the right. If you switch to the 2X zoom mode, echoes on the left side of the screen are shown at twice the size as the ones on the right. The echoes that scroll across the screen are the exact same echoes on both sides of the screen. They're simply enlarged on the left side. This feature tracks the bottom, keeping it on the display at all times, when the automatic feature is on. Once you've set the zoom as desired, press the CLEAR key to erase the menus.

Press the RANGE key to turn the zoom feature off.

## ZOOM - MANUAL MODE

When you press the zoom key while the unit is in the manual mode, the screen shown below appears. The unit is automatically placed in the 4X zoom mode. For a 2X zoom, simply press the key adjacent to the 2X/4X label. For a split screen zoom, press the key adjacent to the SPLIT/FULL label. Remember, the UltraNavGPS won't track the bottom signal while it's in the manual mode.



To adjust the zoom, press the key adjacent to the ADJUST label. A screen similar to the one on the right appears. A zoom bar and adjust arrows appear on the screen. The echoes on the left side of the screen are the ones that appear between the top and the bottom of the zoom bar. Press the keys adjacent to the arrows to move the zoom bar up or down. As you adjust the zoom bar, the echoes move on the left side of the screen at the same time. The zoom adjust menus will automatically clear a few seconds after you've pressed the last key.

## MENUS

The UltraNavGPS uses menus extensively to guide you through the functions and features of the unit. The menu key accesses many of these features, allowing you to customize the unit to your particular needs and water conditions. Although you may have to leave one menu and enter another to reach the desired function, all you have to do is press the menu key to select the next menu. If you ever get lost in a menu, simply press

## ERASING A ROUTE

To erase a route, press the MENU key until the "ROUTES" label appears, then press the key next to that label. The route selection screen shown on the previous page appears. Press the keys adjacent to the "UP" or "DOWN" labels to view a different route number. When the desired route shows on the display, press the key adjacent to the "SELECT" label. The route menu screen shown in the middle of the previous page appears. To erase the selected route, press the key adjacent to the "ERASE ROUTE" label. The UltraNavGPS returns to the last used GPS or plotter display. The route is now erased from memory.

## CANCEL NAVIGATION

To stop the UltraNavGPS from navigating on a route or to a waypoint, use the Cancel Navigation feature. To do this, simply press the MENU key until the "CANCEL NAV" label appears. Now press the key adjacent to that label. The UltraNavGPS immediately stops showing navigation information to the waypoint. It also cancels the route, if it was in use.

## GPS ALARMS

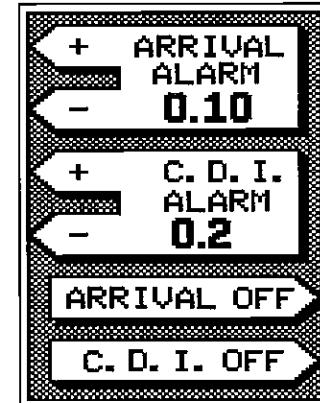
The UltraNavGPS has two GPS alarms. One is an arrival alarm that sounds when you come within a preset distance to a waypoint. The other is a C.D.I. alarm that sounds when you move off course more than the alarm's setting.

## ARRIVAL ALARM

The arrival alarm sounds a tone when your position is within the alarm's radius of a waypoint. For example, the alarm sounds if you come within .1 nautical miles of a recalled waypoint if the arrival alarm's setting is .1 nautical mile.

To adjust the arrival alarm, press the MENU key, then press the key adjacent to the GPS ALARMS label. The screen shown below appears. When the UltraNavGPS is turned on for the first time, the arrival alarm is preset to .1 nautical mile. To increase the arrival alarm radius, press the key adjacent to the + arrow. To decrease the alarm radius, press the key adjacent to the - arrow. Press the key adjacent to the "ARRIVAL OFF" label to turn it off.

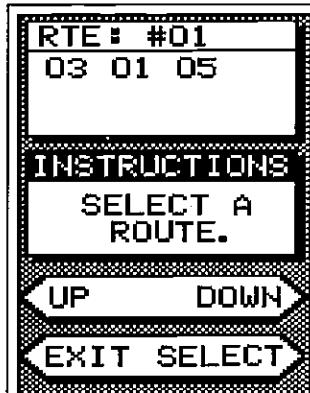
Press the CLEAR key to exit the alarm menu.



GPS ALARMS SCREEN

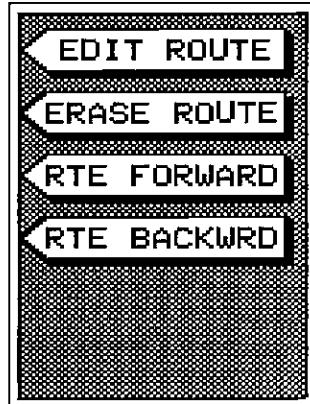
## FOLLOWING A ROUTE

To follow a route, press the MENU key until the "ROUTES" label appears, then press the key next to that label. The screen shown at right appears. This is the route selection menu. The route number appears at the top of the screen. Waypoints stored in the route show in the box immediately beneath the route number. Press the keys adjacent to the "UP" or "DOWN" labels to view a different route number. When the desired route shows on the display, press the key adjacent to the "SELECT" label.



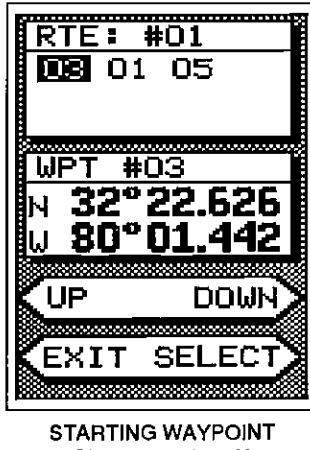
ROUTE SELECT SCREEN

The screen shown at right appears. To travel forward through the route (i.e., from the first waypoint on the list to the last), press the key next to the "RTE FORWARD" label. To travel backward through the route, press the key adjacent to the "RTE BACKWRD" label. The screen shown below appears. Now select the starting waypoint. If the first waypoint on the list is the one you wish to travel to first, simply press the key adjacent to the "SELECT" label.



ROUTE MENU

However, if you wish to start with a waypoint in the middle of the route, press the key adjacent to the "UP" or "DOWN" labels to move through the waypoint list. When the box surrounds the desired starting waypoint near the top of the screen, press the key adjacent to the "SELECT" label. The UltraNavGPS returns to the last used GPS or plotter screen showing navigation data to the first waypoint in the route. After you arrive at that waypoint, the UltraNavGPS will automatically switch to the next waypoint in the route. This repeats until you've travelled to all of the waypoints in the route.



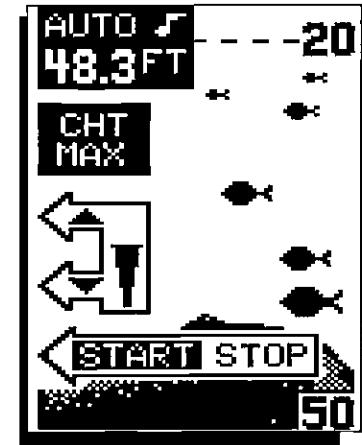
STARTING WAYPOINT  
SELECT SCREEN

the key adjacent to the CLEAR label. There are eight sonar menus accessible with the menu key. The menu key shows different menus, depending on which mode the unit is in. For example, if a sonar screen is showing, pressing the menu key will show the first sonar menu screen. If the plotter screen is showing, pressing the menu key displays the first plotter menu screen.

## SONAR MENU - PAGE 1

### CHART SPEED

The rate echoes scroll across the screen is called the chart speed. It's adjustable by first pressing the menu key, then pressing the key adjacent to the "ADJUST CHART SPEED" label. The chart speed menu appears on the left side of the screen. Increase the chart speed by pressing the key adjacent to the up arrow or decrease it by pressing the key adjacent to the down arrow. The percentage of chart speed in use changes as the arrow keys are pressed. The bar chart also gives a graphical indication of the chart speed. You can see the change on the screen (both on the menu and on the chart record) as you press the keys. After you've made



the adjustment, press the key adjacent to the CLEAR key to erase the menu.

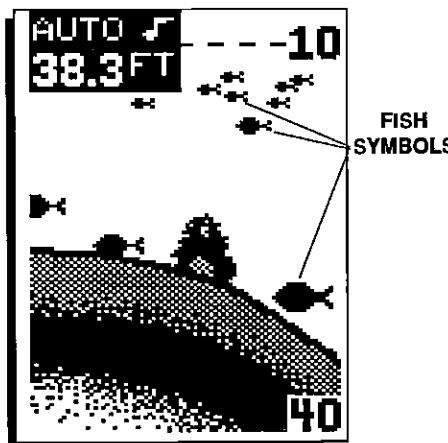
To stop the chart, press the key adjacent to the "START STOP" label. Repeat this step to start the chart again.

## SONAR MENU - PAGE 1

### FISH I.D.

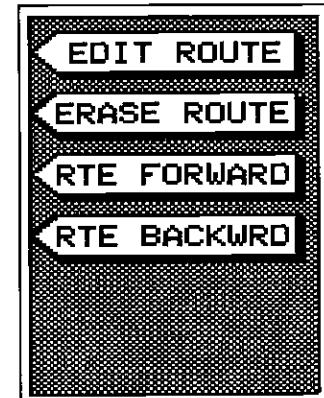
The Fish I.D. feature identifies targets that meet certain conditions as fish. The micro-computer analyses all echoes and eliminates surface clutter, thermoclines, and other signals that are undesirable. In most instances, remaining targets are fish. The Fish I.D. feature displays symbols on the screen in place of the actual fish echoes. There are four fish symbol sizes: tiny, small, medium, and large. These are used to designate the relative size between targets. In other words, it displays a small fish symbol when it thinks a target is a small fish, a medium fish symbol on a larger target, etc.

The micro-computer is sophisticated, but it can be fooled. It cannot distinguish between fish and other suspended objects such as trotlines, turtles, submerged floats, air bubbles, etc. Individual tree limbs extending outwards from a group of limbs is the hardest object for the Fish I.D. feature to distinguish from fish. You may see Fish I.D. symbols on the screen when actually, there are no fish. Practice with the unit in both the Fish I.D. mode and without to become more familiar with the Fish I.D. feature.



When the UltraNavGPS is turned on, the Fish I.D. feature is automatically turned on, also. To turn the Fish I.D. feature off, press the menu key, then press the key adjacent to the "Turn Fish-ID Off" label. Or press the AUTO key. This turns the Fish I.D. feature and automatic off at the same time. To turn the Fish I.D. feature on again, first press the menu key. Next, press

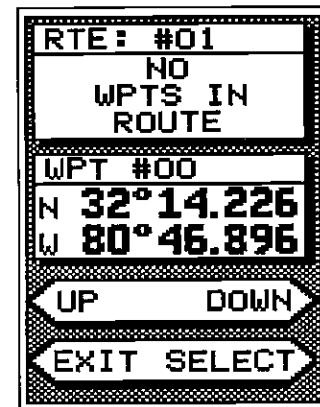
Now press the key next to the "EDIT ROUTE" label. The screen shown below right appears. This is the waypoint selection menu. This lets you choose which waypoints are to be placed in your route. The first waypoint's number and location appears in the center of the screen. Use the keys adjacent to the UP and DOWN arrows to move through the waypoint list. To add a waypoint to the route, simply press the key adjacent to the "SELECT" label.



ROUTE MENU

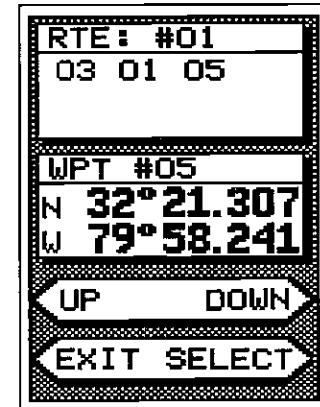
### IMPORTANT!

You must select waypoints in the order they're to be used in the route. In other words, suppose you want a route that consists of waypoints 1, 3, and 5. But you wish to travel to 3 first, then 1, and finally 5. In this case, you must select waypoint 3, 1, and 5 in that order when creating the route.



EDIT ROUTE SCREEN

As each waypoint is selected, its number appears beneath the route number in the box near the top of the screen. After all of the waypoints have been selected, press the key next to the "EXIT" label. This stores your route in memory.



EDIT ROUTE SCREEN  
WITH WAYPOINTS SELECTED

memory storage, the STAT message will read "CHECKSUM". **Do not use this waypoint if a checksum error message is displayed!** Erase it and re-enter the location. If you wish to navigate to the displayed waypoint, simply press the key adjacent to the ENTER label. The UltraNavGPS will return to the last used GPS or Plotter screen with navigation data for the recalled waypoint displayed. To exit this menu without recalling a waypoint, press the key adjacent to the CLEAR label.

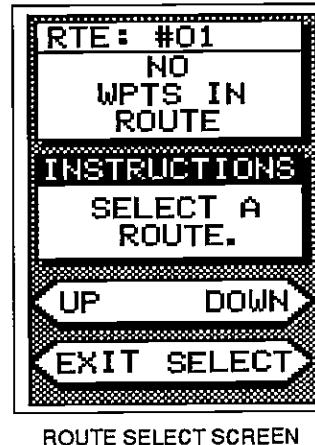
## ROUTES

The UltraNavGPS gives you the ability to travel to several waypoints in a row. This feature is called Routes. When you run a route, the UltraNavGPS gives you navigation information to the first waypoint in the route's list. When you come within the arrival alarm's radius at the first waypoint, the arrival alarm sounds, and the UltraNavGPS automatically switches to the next waypoint in the route. The process repeats until all of the waypoints in the route have been reached.

There are two steps necessary to create a route. First select the route's number (from 1 to 20). Then pick the waypoints to use in the route. To follow a route, you simply select the route and determine which waypoint in the route to start with. Then tell the unit if you're going to travel forward through the route or backward. After completing these steps, the UltraNavGPS will show navigation information to the first waypoint in the route.

## CREATING A ROUTE

To create a route, first press the MENU key until the "ROUTES" label appears. Now press the key adjacent to that label. The screen shown at right appears. This is the route selection screen. Press the key next to the UP or DOWN arrows until the desired route number appears at the top of the screen. If there are waypoints stored in the route, they will appear beneath the route number. Once the desired route number displays at the top of the screen, press the key next to the "SELECT" label. The screen shown at the top of the next page appears.



ROUTE SELECT SCREEN

the key adjacent to the "Turn Fish-I.D. On" label. The menu immediately disappears and the sonar screen returns. Echoes will continue to scroll across the screen, however, the surface clutter will no longer be displayed. Any targets the micro-computer determines are fish will be displayed as fish symbols.

Remember, the Fish I.D. feature can't be used when the UltraNavGPS is in the manual mode. If you turn the Fish I.D. feature on when the UltraNavGPS is in manual, the micro-computer will turn the automatic feature on. If you turn automatic off when the Fish I.D. feature is on, the Fish I.D. feature will be turned off also.

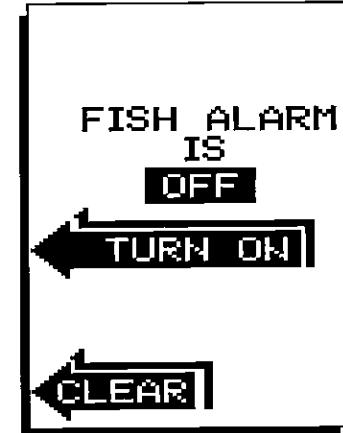
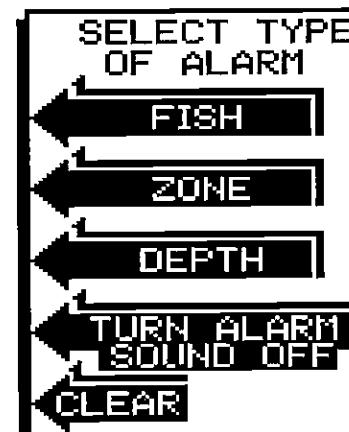
## ALARMS

The UltraNavGPS has three different types of alarms. The first is the Fish Alarm. It sounds when the Fish I.D. feature determines a group of echoes is a fish. Another alarm is the Zone Alarm which consists of a bar. Any echo that appears inside this bar triggers the alarm. The last alarm is called the Depth Alarm. Only the bottom signal will trigger this alarm. This is useful as an anchor watch, a shallow water alert, or for navigation.

You can also turn the alarm speaker off through the ALARM menu.

## FISH ALARM

Use the fish alarm for a distinctive audible alarm when fish or other suspended objects are detected by the Fish I.D. feature. To use the fish alarm feature, first press the MENU key. Next, press the key adjacent to the "ALARMS" label. Now press the key adjacent to the "FISH" label. The menu shown below right appears.



To turn the fish alarm on, press the key adjacent to the "TURN ON" label. The screen will clear and return to the chart display. Each time a fish symbol displays on the screen, a tone will sound. The word "FISH" also shows in the lower left corner of the screen. The symbols flash when the alarm sounds.

To turn the fish alarm off, again first press the MENU key, then press the key adjacent to the "ALARMS" label. Now press the key next to the "FISH" label. Finally, press the key adjacent to the "TURN OFF" label. The alarm is now off.

## ZONE ALARM

To activate the Zone Alarm, first press the MENU key. Next, press the key next to the "ALARMS" label. Finally, press the key adjacent to the "ZONE ALARM" label. A screen similar to the one below appears. The words "ZONE ALARM" show on the screen's right side, signifying the Zone Alarm is active. The adjustment label appears on the left side of the display, whereas the zone bar shows on the far right side. Any echo that appears between the top and bottom of this bar will trigger the alarm. This alarm will sound on fish, structure, bottom echoes, etc.



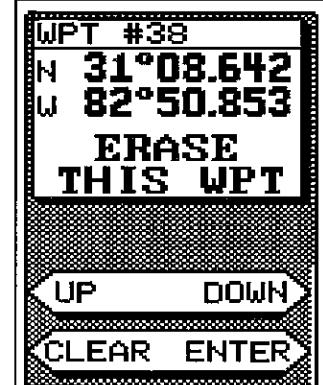
To adjust the top of the zone alarm bar, first press the key next to the SET SHAL/DEEP label. The SHAL letters appear in reverse. Now press the key adjacent to the top arrow to move the top of the bar shallower. To adjust the top of the bar deeper, press the key adjacent to the down arrow. To adjust the bottom of the zone alarm bar, again press the key adjacent

label. The UltraNavGPS returns to the last used position, navigation, or plotter screen. If you use any navigation or plotter screens, the UltraNavGPS will show navigation information to the location you entered.

## Erase a Waypoint

Although you can store a location under a waypoint number that has already had a location assigned to it, the Waypoint Quicksave feature won't. It only assigns empty waypoint numbers to locations. Therefore, the Waypoint Erase feature lets you erase positions from the waypoint table.

To erase a waypoint, first press the WAYPT SAVE key, then press the key adjacent to the ERASE A WPT label. The screen shown at right appears. Waypoint number 00 appears first. To erase this location, simply press the key adjacent to the ENTER label. To erase the location from a different waypoint number, press the key adjacent to the UP label to increase the waypoint number (i.e. from waypoint number 1 to 2). Press the key adjacent to the DOWN label to decrease the waypoint number. When you've finished erasing waypoints, press the key adjacent to the CLEAR label. This will return the UltraNavGPS to the last used sonar, position, plot, or navigation screen.

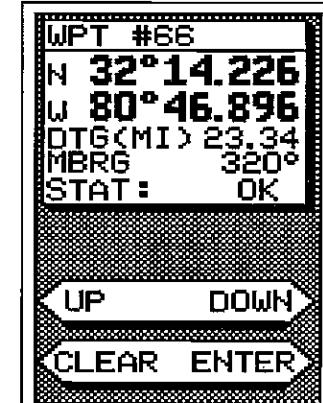


ERASE A WAYPOINT SCREEN

## Recall a Waypoint

You must recall a waypoint in order to navigate to that position with the UltraNavGPS. To recall a waypoint, first press the WAYPT RECALL key. The screen shown below appears.

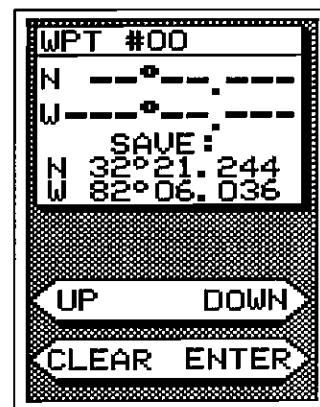
The first waypoint that appears is number 00. If this isn't the waypoint you desire, press the key adjacent to the up or down arrows. This moves the list of waypoints up or down. The latitude/longitude stored in this location shows directly beneath the waypoint number. Distance To Go (DTG) and Bearing to Waypoint (BRG) also show on this page. Beneath the Bearing display is the status display (STAT). It will read "OK" if the waypoint position data is valid. If there is anything wrong with the



WAYPOINT RECALL SCREEN

the key adjacent to the "FINISHED" label. The View/Save Waypoint screen shown below appears next.

The first waypoint number in the list that is empty appears at the top of the page. This is the number that the position will be stored under. The latitude/longitude stored in this location shows directly beneath the waypoint number. Since there is no location stored in this example, blanks show in the latitude/longitude window. Beneath this location is the position you entered. If you wish to save this location under this waypoint number, simply press the key adjacent to the ENTER label. To exit without saving the location, press the CLEAR key.



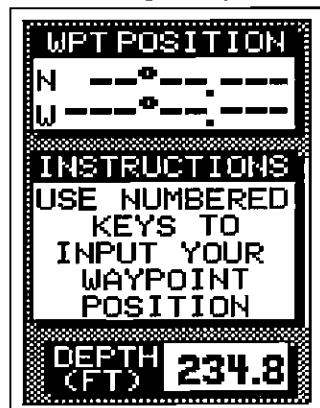
VIEW/SAVE WAYPOINT SCREEN

To save the location under a different waypoint number, press the key adjacent to the UP label to increase the waypoint number (i.e. from waypoint number 1 to 2). Press the key adjacent to the DOWN label to decrease the waypoint number. Once you've decided the waypoint number to save the location under, press the key adjacent to the ENTER label. This will store the location under the waypoint number you selected and return to the last used sonar, position, plot, or navigation screen.

## Go To Lat Lon

If you wish to simply go to a location, but not save it as a waypoint, use the Go To Lat Lon feature on the Waypoint Save menu. After pressing the key adjacent to the Go To Lat Lon label, the screen shown below appears.

Using the numbered keys, enter the location's latitude/longitude position. Use the CLEAR key as a backspace if you make a mistake. In other words, pressing the CLEAR key erases the last number entered. Notice that the position entered is in degrees, minutes, and hundredths of a minute. (Not seconds!) After you've entered the last number, a new screen automatically appears. Press the key adjacent to the "NS TOGGLE" to switch the latitude from north to south. Press the key adjacent to the "W/E TOGGLE" to switch the longitude from west to east. If the position shown at the top of the screen is correct, press the key next to the "FINISHED"



GOTO WAYPOINT SCREEN

to the SET SHAL/DEEP label. You can now adjust the bottom of the zone alarm bar using the keys adjacent to the up and down arrows.

Once you've made the adjustments, press the CLEAR key to erase the menus.

To turn the Zone Alarm off, return to the Zone Alarm menu, then press the key adjacent to the "ALARM OFF" label.

## DEPTH ALARM

The Depth Alarm works off the bottom signal only. No other echo will trigger this alarm. The Depth Alarm is actually two different alarms. It consists of a shallow alarm and a deep alarm. The shallow alarm sounds a warning tone when the bottom signal goes shallower than the alarm set



DEPTH ALARM MENU

point. The deep alarm sounds when the bottom signal goes deeper than the alarm set point. Use the shallow alarm to warn you of shallow water. Use the deep alarm to alert you to deeper water, such as a drop-off.

To turn the Depth Alarm on, first press the MENU key. Now press the key next to the "ALARMS" label. Next, press the key adjacent to the "DEPTH" label. The screen shown above appears.

The bottom depth shows at the top of the display. The shallow and deep alarm adjustment arrows are beneath the digital depth. Now simply press the key adjacent to the up arrow to increase the depth or the down arrow

to decrease it on the desired alarm. The shallow alarm was adjusted in this example, so the key adjacent to the up arrow on the Shallow Alarm was pressed.

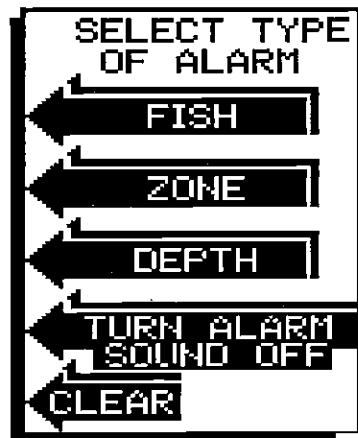
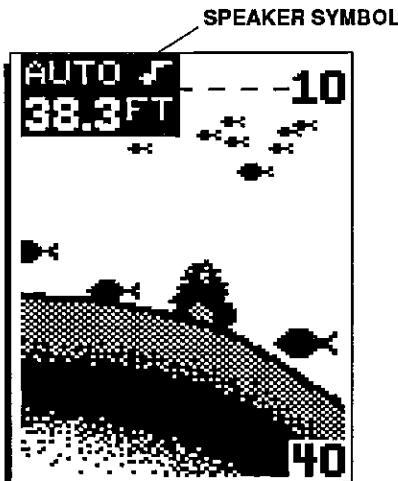
The deep alarm adjusts and activates exactly like the shallow alarm. The only difference is the sound the deep alarm makes when the bottom goes deeper than the alarm depth. This tone is different so you can tell by the sound which alarm was triggered.

## AUDIO ALARM ON/OFF

When the UltraNavGPS is first turned on, the audio alarm (speaker) is automatically enabled. This is indicated by a note symbol at the top of the screen.

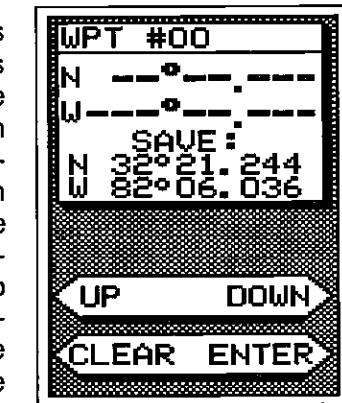
To turn the audio alarm on or off, press the MENU key. Next, press the key adjacent to the "ALARMS" label. Now press the key adjacent to the "Turn Alarm Sound Off" label to turn the audio off. To turn the audio alarm on, repeat the above steps. The label that was used to turn the speaker off now reads "Turn Alarm Sound On." Press the key adjacent to this label to turn the speaker on.

**NOTE:** The words corresponding to the alarm in use will still flash on the display when the alarm is triggered even if the speaker is turned off. For example, the word "ZONE" flashes when the zone alarm is triggered.



number that already has a position assigned to it using this method.) To save your present position, press the WAYPTSAVE key. Now press the key adjacent to the "VIEW/SAVE LL" label. A screen similar to the one below appears.

The first waypoint number in the list that is empty appears at the top of the page. This is the number that your present position will be stored under. The latitude/longitude stored in this location shows directly beneath the waypoint number. Since there is no location stored in this example, blanks show in the latitude/longitude window. Beneath this location is your present position. If you wish to save this location under this waypoint number, simply press the key adjacent to the ENTER label. To exit without saving the location, press the CLEAR key.

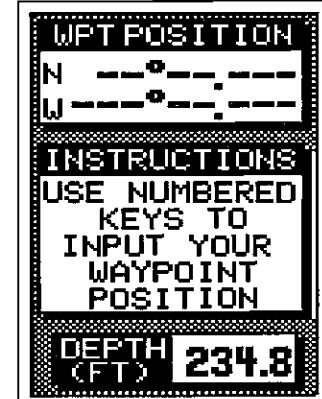


VIEW/SAVE WAYPOINT SCREEN

To save the location under a different waypoint number, press the key adjacent to the UP label to increase the waypoint number (i.e. from waypoint number 1 to 2). Press the key adjacent to the DOWN label to decrease the waypoint number. Once you've decided the waypoint number to save the location under, press the key adjacent to the ENTER label. This will store the location under the waypoint number you selected and return to the last used position, plot, or navigation screen.

## Enter New Waypoint

To save a location other than your present position, press the WAYPTSAVE key, then press the key adjacent to the "INPUT LL WPT" label. The screen shown below appears. Using the numbered keys, enter the location you wish to save. Use the CLEAR key as a backspace if you make a mistake. In other words, pressing the CLEAR key erases the last number entered. Notice that the position entered is in degrees, minutes, and hundredths of a minute. (Not seconds!) After you've entered the last number, a new screen automatically appears. Press the key adjacent to the "N/S TOGGLE" to switch the latitude from north to south. Press the key adjacent to the "W/E TOGGLE" to switch the longitude from west to east. If the position shown at the top of the screen is correct, press



ENTER WAYPOINT SCREEN

Charts are usually laid out according to a Mercator projection which uses true north. If you plot a course on a chart using the Mercator projection, you'll either have to convert magnetic readings to true or use true readings.

The UltraNavGPS can display navigation information in magnetic or true. When it's turned on for the first time magnetic is used. To switch to true, press the MENU key, then press the key adjacent to the "CHANGE SETUP" label. Now press the MENU key two times. The "SELECT TRUE BEARING" label is on this page. Finally, press the key adjacent to the "SELECT TRUE BEARING" label. This will cause all navigation displays to show information in degrees true. To switch back to magnetic, repeat the above steps. The menu now reads "SELECT MAGNETIC BEARING". Press the key adjacent to this menu for magnetic data.

## WAYPOINT NAVIGATION

### HOW TO SAVE A WAYPOINT

Waypoints are locations on the earth's surface that you wish to go or return to. Waypoints are useful for marking shipwrecks, hot fishing spots, and other fishing or navigational locations. Storing waypoint's in the UltraNavGPS's memory makes it easy to return to virtually any point in the world simply by pressing a few buttons. The UltraNavGPS can store up to 100 waypoints. You can store your present position as a waypoint or enter latitude/longitude positions as waypoints.

### Saving Present Position as a Waypoint

#### (Quick Save Feature)

The UltraNavGPS lets you save your present position as a waypoint with only one key press. This "Quick Save" feature lets you save the position of a wreck or other locations quickly and easily.

To save your present position as waypoint, simply press the WAYPT QUICKSAVE key. The UltraNavGPS takes the present position and assigns the first available waypoint number to it. It then sounds a tone indicating the location has been stored.

### Saving Present Position - View and Save Method

The "Quick Save" feature doesn't let you select the waypoint number. You have to use the next available number when using that method. The View and Save method lets you pick the waypoint number that your present position is stored in. (Note: You can store a position under a waypoint

## SONAR MENU - PAGE 2

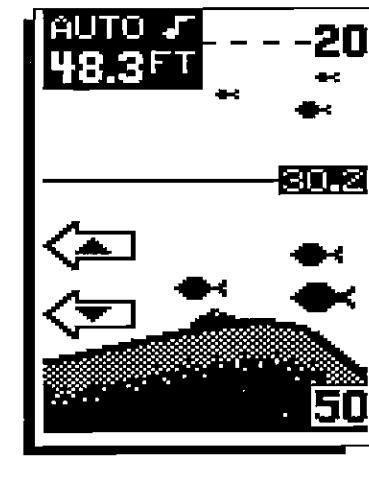
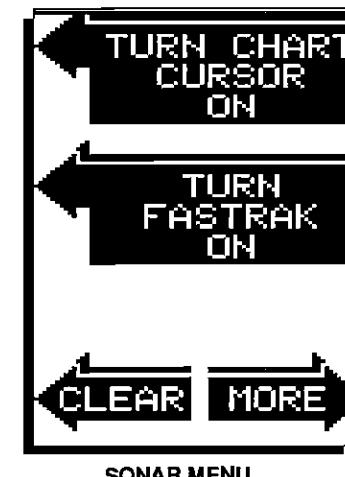
### CHART CURSOR

The UltraNavGPS has a chart cursor that allows you to pinpoint a target's depth. The cursor is simply a horizontal line that extends across the display from left to right. A depth box at the end of the line on the right side shows the line's depth. In the example below, the cursor (line) is at 30.2 feet.

To display the chart cursor, press the menu key twice. Now press the key adjacent to the "TURN CHART CURSOR ON" label. A screen similar to the one below appears.

Use the keys adjacent to the up and down arrow to move the cursor up or down to the desired depth.

To turn the chart cursor off, press the menu key twice. Now press the key adjacent to the "TURN CHART CURSOR OFF" label. The UltraNavGPS returns to the sonar screen without the chart cursor.



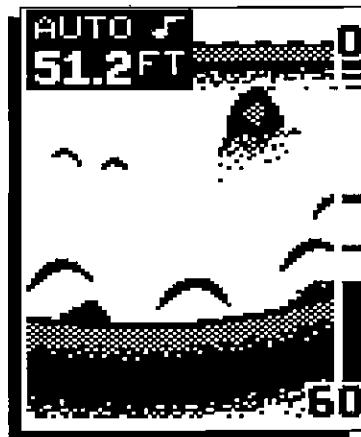
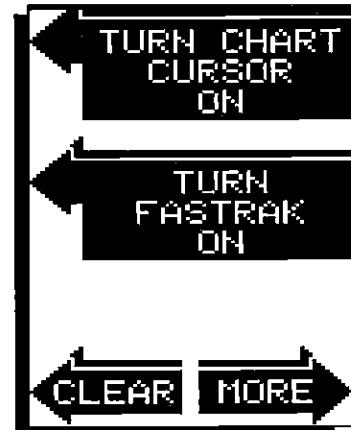
NOTE: The Chart Cursor won't work when FASTRAK is on or if the Zone Alarm or Zoom Window bars are activated.

## SONAR MENU - PAGE 2

### FASTRAK

This feature converts all echoes to short horizontal lines on the display's far right side. The graph continues to operate normally. FASTRAK gives you a rapid update of conditions directly under the boat. This makes it useful for ice fishing, or when you're fishing at anchor. Since the unit is not moving, fish signals are long, drawn out lines on a normal chart display. FASTRAK converts the graph to a vertical bar graph that, with practice, makes a useful addition to fishing at a stationary location.

To turn FASTRAK on, press the menu key twice, then press the key adjacent to the "TURN FASTRAK ON" label. To turn it off, repeat the same steps. The "TURN FASTRAK OFF" label appears instead of the "TURN FASTRAK ON" label.



## SONAR MENU - PAGE 3

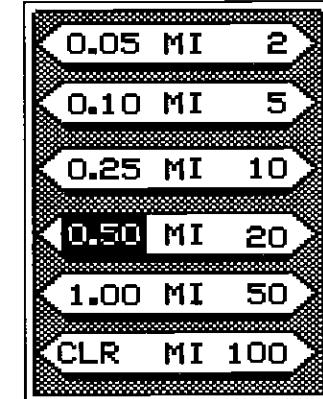
### SELECT DIGITAL DISPLAYS

The UltraNavGPS can display the depth, speed, surface water temperature, and distance log on the upper left portion of the screen, if the optional ST-T speed/temp sensor is attached. It can also show your position in latitude/longitude. When the UltraNavGPS is first turned on, only the depth is displayed. You can turn on each digital display as desired.



### Plot Radius

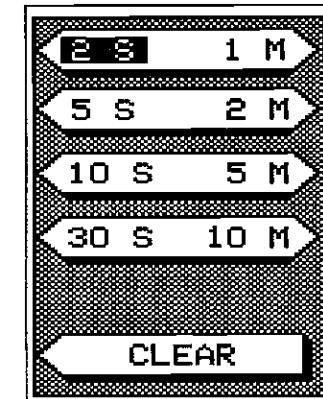
Use this menu to change the plotter's radius. The plot radius is .05 statute miles when the UltraNavGPS is turned on for the first time. The available plot radii are .05, .10, .25, .50, 1, 2, 5, 10, 20, 50, and 100 miles. This lets you "zoom in" to see small variations in your course or "zoom out" to see your starting position, present position, track, course, and destination.



PLOTTER RADIUS MENU

### Plot Update

The plotter shows your track by drawing a solid line behind your present position. The position is updated once every two seconds when the unit is turned on for the first time. To change the update rate, press the MENU key while the unit is in the plotter mode. Now press the key adjacent to the PLOT UPDATE label. The screen shown at right appears. The available plot update times are 2, 5, 10, and 30 seconds, 1, 2, 5, and 10 minutes. Simply press the key adjacent to the desired update time. The UltraNavGPS immediately returns to the plotter screen using the new time.



PLOTTER UPDATE MENU

### Clear Plot

To clear or erase the solid track line from the screen, use the Clear Plot menu selection. The plotter will continue to draw your track after this key is pressed, however your present position will be centered on the screen.

### TRUE and MAGNETIC POSITION

Most people realize there is a difference between true and magnetic north. True north is the top of the world. It's where all lines of longitude converge. Magnetic north is the location our compasses point. It lies several hundred miles to the south of true north, at a location in Canada.

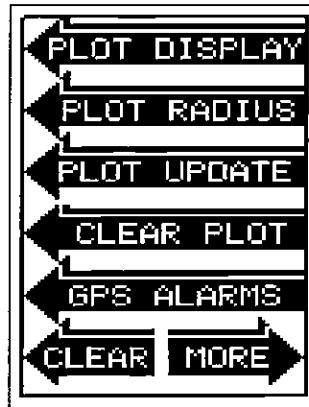
The destination waypoint number displays in the lower left corner of the screen. In this example, waypoint number 10 is the destination. Your present position shows at the bottom of the screen. You can switch from present position to Distance to go (DTG) and Course over ground (COG) from the plotter menu.

An arrival alarm can be set to sound a tone when you come within a preset distance to the destination. See the section on alarms for more information about the arrival alarm.

## PLOTTER MENUS

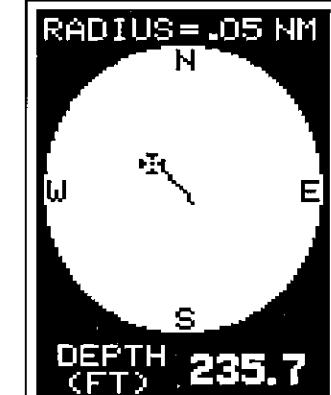
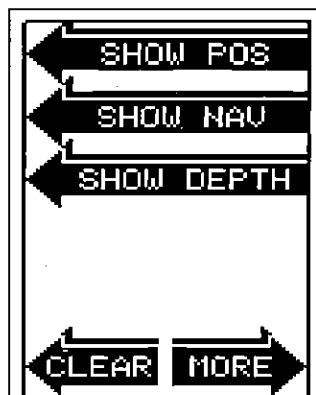
Pressing the MENU key while the plotter displays gives you a new set of menus. Most of the items on the first menu page pertain only to the plotter.

PLOTTER MENUS



## Plot Display

This menu switches the display at the bottom of the plotter screen from present position to Distance to go (DTG) and Course over ground (COG) or water depth. Press the key adjacent to the Plot Display label and the menu shown below appears. Now press the key adjacent to the SHOW POS label for present position. Pressing the key adjacent to the SHOW NAV label displays Distance to go (DTG) and Course over ground (COG) on the plotter. Press the key next to the "SHOW DEPTH" label to display water depth. The unit returns to the plotter screen after the key is pressed.



PLOT DISPLAY MENU

To select the digital displays menu, first press the menu key three times. Next, press the key adjacent to the "SELECT DIGITAL DISPLAYS" menu at the top of the screen. A screen similar to the one at right appears.

Now press the key adjacent to the desired display. For example, to turn the temperature display on, press the key adjacent to the "TEMP. IS OFF" label. Once you do this, the display will show the temperature and read "TEMP. IS ON". You can turn each display on or off individually.

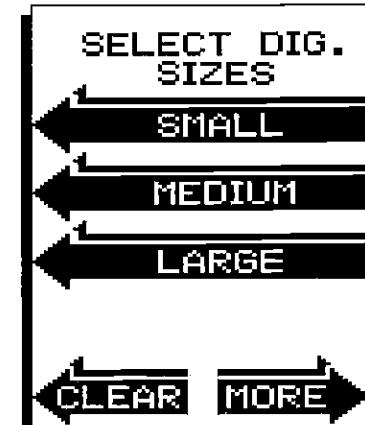
Press the CLEAR key to exit from this menu or wait approximately ten seconds and the menus will automatically clear.

**NOTE:** The "GPS IS OFF" means the GPS position display on the sonar screen is off. This screen does not turn the GPS on or off.

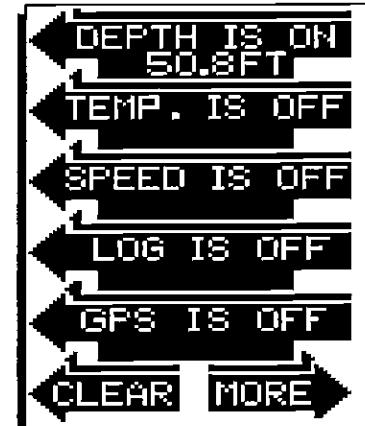
## SONAR MENU - PAGE 3

### SELECT DIGITAL SIZES

The digital displays can be shown in three different sizes - small, medium, or large. To change the size of the digital display, first press the menu key three times. Now press the key adjacent to the "SELECT DIGITAL SIZES" menu. The screen shown below appears.

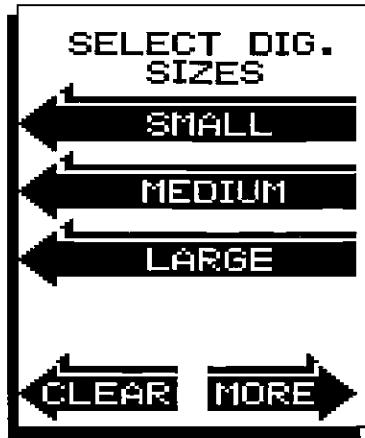


PLOTTER WITH DEPTH DISPLAY



Now simply press the key adjacent to the desired label. For example, if you press the key adjacent to the "SMALL" label, the digital displays are shown in small numbers. (Note: The GPS displays are always shown in small numbers.)

The large digital selection erases the chart and shows the digital displays in large. Pressing the menu key gives only one menu page which is different from other menus. This menu lets you go back to chart information, placing the digital display back in the medium size, select digital displays, and adjust the depth alarm. Returning to the chart restores the normal menu operation.



#### SONAR MENU - PAGE 4

##### SELECT UNITS OF MEASURE

The UltraNavGPS can display the water depth in feet or meters, surface water temperature in degrees Fahrenheit or Celsius, speed in statute miles per hour or knots, and distance (log) in miles or nautical miles. This menu switches all displays to their metric equivalent and back again. You cannot switch each display individually.

To change the units of measure, first press the menu key four times. The screen at the top of the next page appears. Next, press the key adjacent to the "SELECT UNITS OF MEASURE" label. The screen at the above right appears. Now press the key adjacent to the "CHANGE TO METERS, °C, NAUTICAL MILES" label. The unit of measure change to the metric equivalent. Repeat these steps to switch the units of measure again.



SMALL DIGITAL DISPLAY

##### PLOTTER

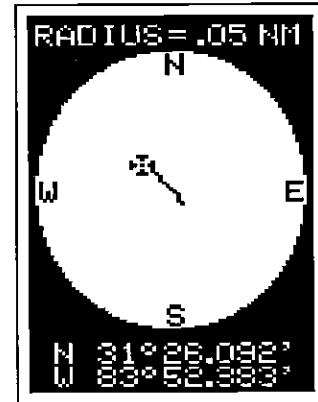
The plotter lets you see your course and direction of travel on the screen. If you've recalled a waypoint, the plotter shows your starting location, present position, and destination. However, you do not have to recall a waypoint to use the plotter.

To use the plotter, simply press the PLOT key. A screen similar to the one below appears.

The flashing cross is your present position. The solid line is your track, or path you have just traveled. The circle is a compass rose marked with North, South, East, and West. The circle's radius displays at the top of the screen. This is the distance from the center to the edge of the circle. Your present position is shown at the bottom of the screen.

If your present position starts to move outside of the circle, the UltraNavGPS clears the display, then re-draws your present position closer to the center of the screen. Your present position will always be displayed on the plotter.

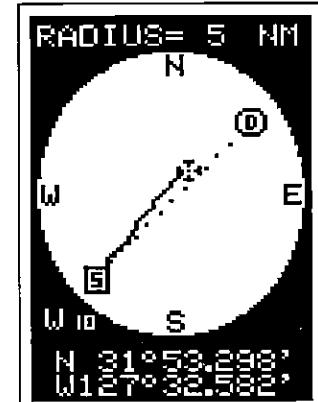
To clear the plotter screen, see the Plotter Menus section.



##### Plotting with a Waypoint

Using the plotter with a recalled waypoint or route is an easy way to see the effects of wind and current on your boat. It also simplifies navigation to a fixed point. To use the plotter in this manner, first recall a waypoint or start a route. (See the Waypoint Recall section for more information.) Then press the PLOT key. A screen similar to the one below appears.

The "S" is your starting location. This was your position when you recalled the waypoint. The flashing cross is your present position, and the "D" is the destination (recalled waypoint). If you are using a route, it's the first waypoint in the route. The dotted line is the shortest, most direct course from the starting point to the destination. Follow this line to get to the waypoint.



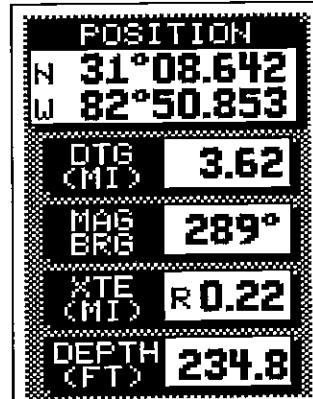
PLOTTER SCREEN

and the outside line and the CDI range is 0.2 miles, then your cross track error is 0.1 miles. The CDI range is the same as the CDI alarm setting. See the section on GPS alarms to change the CDI range.

Using the digital displays at the bottom of the screen along with the graphical display at the top lets you accurately steer the boat to a waypoint.

## NAVIGATION SCREEN

The navigation screen is used when you're navigating to a waypoint. It shows your present position, distance to go (DTG), Bearing to Waypoint (BRG), Cross Track Error (XTE), and water depth (DEPTH). To use the navigation screen, first recall a waypoint, then press the MENU key. Next, press the key adjacent to the "NAV. SCREEN" label. A screen similar to the one at right appears.

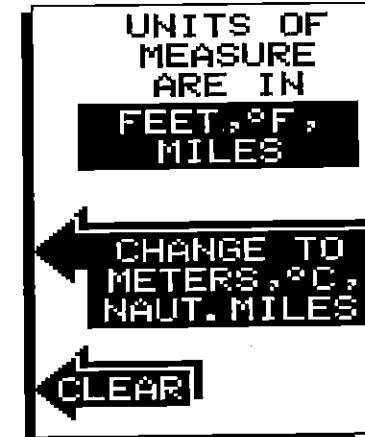
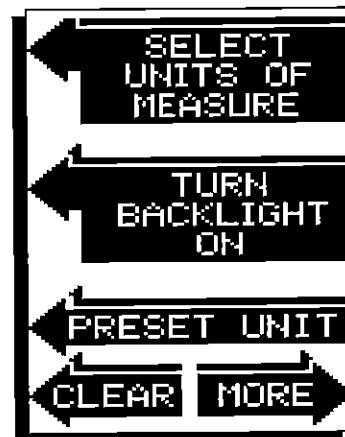
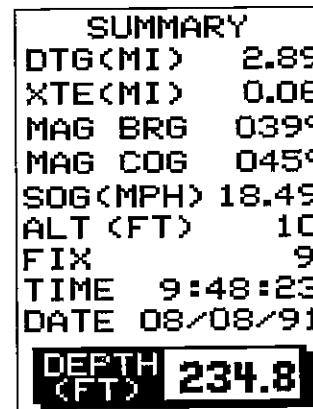


NAVIGATION SCREEN

## NAVIGATION SUMMARY SCREEN

Another navigation screen is available that shows more information than the Navigation screen, but in smaller numbers. This is the Navigation Summary screen. Again, it's used when navigating to a waypoint. To use it, first press the MENU key twice. Now press the key adjacent to the NAV SUMMARY SCREEN label. The screen shown below appears. This display shows Distance To Go (DTG), Cross Track Error (XTE), Bearing to Waypoint (BRG), Course Over Ground (COG), Speed Over Ground (SOG), Altitude (ALT), Fix, time of day (TIME), today's date (DATE), and water depth (DEPTH).

Please note that altitude is also affected by the ellipsoid used by the GPS to calculate position and altitude. Errors in the Altitude display can be affected by both ellipsoid and high levels of SA. See the PCF and Accuracy sections in this manual for more information.



## SONAR MENU - PAGE 4

### BACKLIGHTS

The UltraNavGPS has internal lights for the display and keyboard. To turn these on, press the menu key four times, then press the key adjacent to the "TURN BACKLIGHT ON" label. To turn the backlights off, repeat the same steps.

### RESET

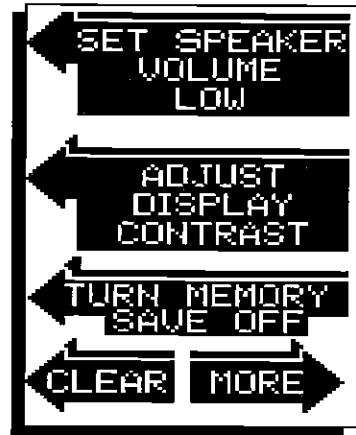
The UltraNavGPS saves all settings such as sensitivity, chart speed, display contrast, and more in battery backed-up memory. This memory is retained even if power is disconnected from the unit. If you need to return the sonar settings to the factory defaults, press the MENU key four times. Now press the key adjacent to the "RESET" label. The unit will reset, return to a sonar screen with all of the original factory settings.

**NOTE:** Preset also resets all GPS settings! The GPS will have to be re-initialized after a preset. It doesn't erase waypoints or routes, however.

## SONAR MENU - PAGE 5

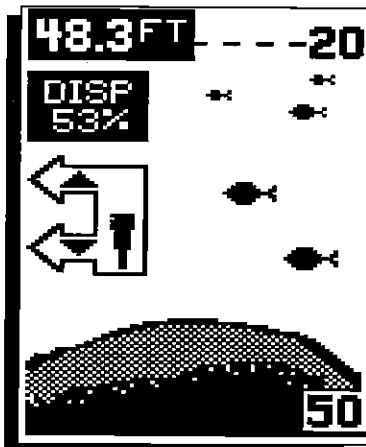
### SPEAKER VOLUME

The speaker volume has two steps - low and high. The speaker volume is high when the unit is first turned on. To change it, first press the menu key five times. Now press the key adjacent to the "SET SPEAKER VOLUME LOW" label. To switch back to the high volume, repeat the above steps.



### DISPLAY CONTRAST

The unit's display contrast is adjustable to suit different lighting conditions. To adjust it, first press the menu key five times. The menu shown above appears. Now press the key next to the "ADJUST DISPLAY CONTRAST" label. The display contrast arrows appear on the left side of the screen. To increase the contrast, press the key adjacent to the up arrow. To decrease it, press the key next to the down arrow. Press the Clear key to erase the menu, or wait approximately ten seconds and it automatically clears.



### MEMORY

The UltraNavGPS saves all settings such as sensitivity, chart speed, display contrast, and more in battery backed-up memory. This memory is retained even if power is disconnected from the unit. If you wish to turn the memory save feature off, press the key adjacent to the "TURN MEMORY SAVE OFF" label on the fifth sonar menu page. This does NOT affect GPS initial settings, waypoints, or routes. To turn the memory save feature on again, press the MENU key until the fifth page appears, then press the key next to the "TURN MEMORY SAVE ON" label.

degrees, 50.853 minutes. Below the present position is course over ground (COG). This is expressed in degrees true or magnetic, depending on the mode the UltraNavGPS is in. Course over ground is the direction the boat is travelling. In other words, if the COG is 180 degrees, then the boat is heading due south.

Fix displays beneath the SOG. Fix shows how well the latitude/longitude filter in the receiver is working. The best fix number is nine (9), the worst is one (1). As the fix number decreases, the position's "jitter" increases. Jitter is the small position changes around a location. In other words, if you hold the boat perfectly still, you'll see the position displayed on the unit "jump around." Very small position changes will constantly occur. This is called jitter; it's normal and happens in all electronic navigation devices. If the fix number and HDOP numbers are good, then the latitude/longitude position shown on the display should also be good, excluding the effect of S/A (selective availability). Also see the Engineering Screen section.

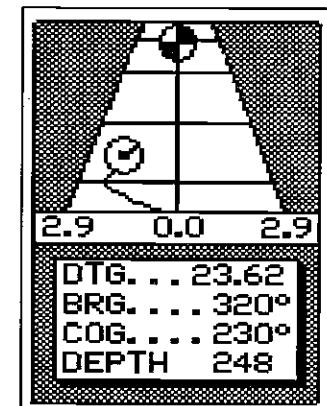
Water depth shows at the bottom of the screen. This is the depth of water from the face of the transducer to the bottom.

### STEERING SCREEN

The steering screen shows a pictorial view of your boat and course travelled. This is called a Course Deviation Indicator or CDI. It also shows Distance To Go (DTG), Bearing to Waypoint (BRG), Course Over Ground (COG), and water depth (DEPTH).

Your present position is shown by the circle with an arrow inside. The arrow shows the direction the boat is heading relative to the waypoint. In theory, if you steer the boat with the arrow always pointing towards the waypoint, then you will arrive at the waypoint. The solid line extending from the circle is your track. To travel directly to a waypoint, try to keep the circle on the center line. The waypoint is depicted by another circle at the top of the CDI display. As you approach the waypoint, the two circles will move closer together. If you travel past the waypoint, the waypoint's circle will move to the bottom of the display.

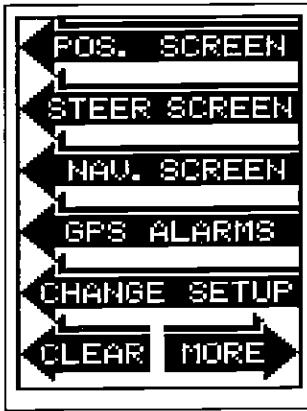
The numbers immediately below the CDI are the CDI range in miles. This gives you an idea of how far off course you are. For example, if the circle is halfway between the course line



STEERING SCREEN

## MENUS

The UltraNavGPS uses menus to guide you through the unit's functions and features. Pressing the MENU key accesses these features, allowing you to customize the unit to your needs. There are several menu "pages" which are accessed by repeatedly pressing the menu key. For example, to see the second menu page, simply press the MENU key two times. If you ever get lost in the menus, simply press the CLEAR key to exit.



## POSITION/NAVIGATION DISPLAYS

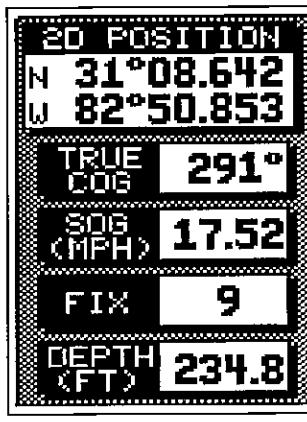
The UltraNavGPS has a position screen, two navigation screens, a plotter, and a steering indicator screen. These displays were carefully designed to show the most important data in large digits. Each of these screens (except the Plotter screen) is available by first pressing the MENU key, then pressing the key adjacent to the desired screen label. The Position, Steer, and Navigation screen selections are on the first menu screen. The Navigation Summary screen selection is on the second menu screen. Simply press the Menu key twice to see the second menu page.

A detailed description of each screen follows.

### POSITION SCREEN

The position screen automatically appears after the UltraNavGPS is initialized. The position display shows your present position, course over ground (COG), speed over ground (SOG), satellite fix, and water depth (DEPTH). The position display at the top of the screen shows if you have a 2D (latitude/longitude only) or 3D fix (latitude/longitude plus altitude).

Your present position displays near the top of the screen in latitude/longitude coordinates. This is expressed in degrees, minutes, and thousandths of a minute. For example, on this page, the present position is 31 degrees, 8.642 minutes latitude. The longitude is 82



POSITION SCREEN

## SONAR MENU - PAGE 6

### DIGITAL SONAR

When the UltraNavGPS is turned on for the first time, the digital depth display is located at the top left corner of the screen. This display comes from a separate digital sonar built into the unit. It displays only the bottom depth. If it loses the bottom, the last known depth will flash on the display. When the digital finds the bottom, it will automatically display the bottom depth again.



The digital sonar can be turned off, however this also turns all automatic features off also, such as auto sensitivity, auto ranging, and the Fish I.D. feature.

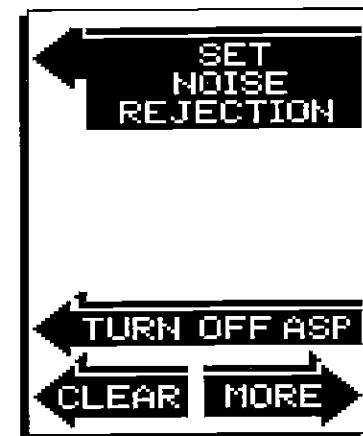
To turn the digital sonar off, press the Menu key six times. Now press the key adjacent to the "TURN DIGITAL SONAR OFF" label. To turn it back on again, repeat the same steps.

## SONAR MENU - PAGE 7

### FISH I.D. ON

### NOISE REJECTION

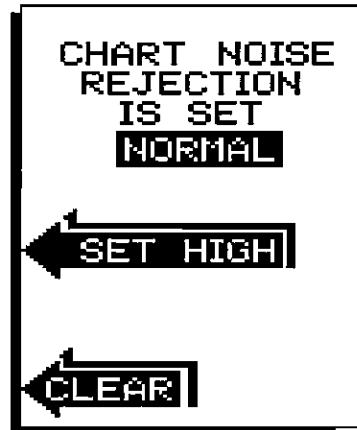
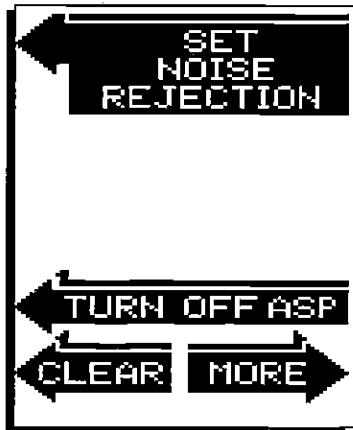
The UltraNavGPS's noise rejection feature is an effective tool in combating noise. In sonar terms, noise is any undesired signal. It is caused by electrical and mechanical sources such as bilge pumps, engine ignition systems and wiring, air bubbles passing over the face of the transducer, even vibration from the engine. In all cases, noise can produce unwanted marks on the display.



The UltraNavGPS has a two step noise rejection system. When the unit is turned on, the noise rejection is on normal. If you have noise problems (identified by random lines or dots on the display), try changing the noise rejection level to high.

To do this, first press the menu key seven times. Now press the key adjacent to the "SET NOISE REJECTION" label.

The screen at the lower right appears. Now press the key adjacent to the "SET HIGH" label. The screen will clear and return to the chart screen. The noise should be cleared from the display as new echoes scroll across the screen. If it isn't, you may have a problem with electrical wiring, engine, or transducer installation. Check with your local dealer, Eagle service center, or the Eagle factory customer service department for help.

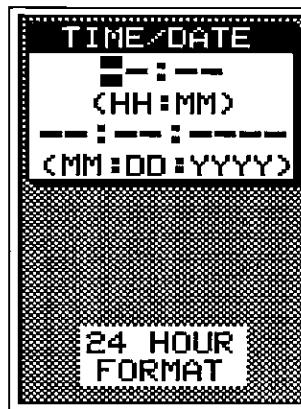


## SONAR MENU -PAGE 7 - ASP (Advanced Signal Processing)

ASP is a program embedded in the UltraNavGPS's computer that continually monitors the signals from the receiver. It determines which echoes are noise, rejects them, allowing target echoes to be displayed with a minimum of screen clutter. This feature is especially useful, since it typically allows you to operate the boat at all speeds without adjusting the sensitivity. When the UltraNavGPS is first turned on, ASP is enabled. To turn ASP off, press the menu key seven times. The menu shown at the top of the next page appears. Now press the key adjacent to the "Turn Off ASP" label. The unit will return to the sonar screen with ASP off. To turn ASP on again, repeat the above steps.

## Enter Time/Date

The Time/Date screen needs your local time and present date. With the numbered keys, enter the present time first, using 24 hour time (2:00 pm = 14:00, etc.). Next, enter the present date in the month/day/year format. For example, October 4, 1991 is entered as 10:04:1991. Make certain to enter the entire year, i.e. 1991 (not 91).



If you make a mistake, press the CLEAR key. This will erase the last number. After the last number in the year is entered, the "ENTER EXIT" label appears. Press the key next to the EXIT label if you need to make a correction. The screen will clear and you will need to re-enter both time and date. Press the key next to the ENTER label if the time and date are correct. This completes the initialization procedure. The position screen appears next.

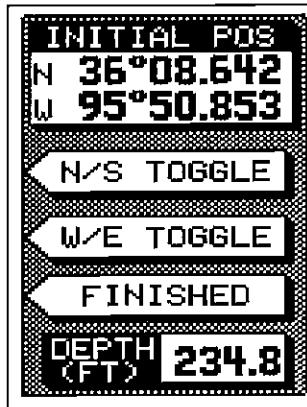
The present position display at the top of the screen flashes, indicating that the unit has not calculated your latitude/longitude. When the flashing stops, the unit is ready for navigation.

### WARNING!

Never navigate with this unit when the position screen flashes the latitude/longitude! This means the unit is not usable for navigation. Always use more than one method to navigate.

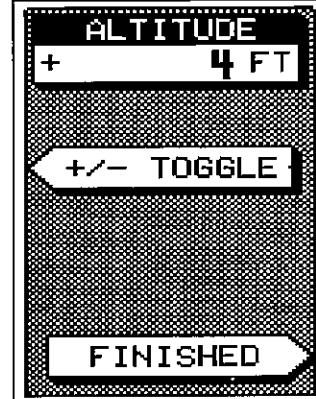
If you move a long distance with the unit turned off from the last time you used the UltraNavGPS (100 miles or more), you may need to re-initialize the unit. If you preset the UltraNavGPS, you will definitely need to re-initialize the unit. The "Initial Setup" menu selection on the GPS' second menu page returns you to the initial setup menu, when needed. Otherwise, you shouldn't need to repeat these steps.

Press the key adjacent to the "N/S TOGGLE" to switch the latitude from north to south. Press the key adjacent to the "W/E TOGGLE" to switch the longitude from west to east. If the position shown at the top of the screen is correct, press the key adjacent to the "FINISHED" label. The Altitude screen appears next.



### Enter Altitude Screen

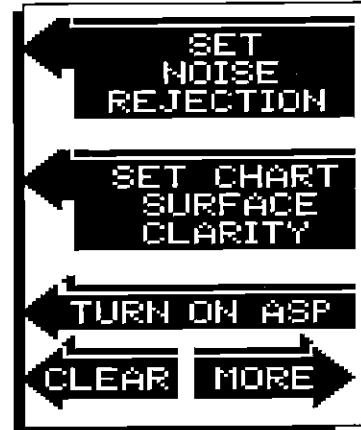
The screen shown below is the Altitude entry screen. The UltraNavGPS needs to know your elevation above sea level. (Not your height above the ground.) Again, an approximation is usually sufficient. Use the numbered keys to enter your altitude data. Press the key adjacent to the "FINISHED" label when you're done. A new label appears: (+/- TOGGLE). Press the key adjacent to this label to switch the altitude you entered from positive to negative. For example, suppose you're in Death Valley and the spot you're standing in is 35 feet below sea level. You would need to enter the numbers "35", then press the key adjacent to the +/- label to change it to -35 feet. After this step is completed, the UltraNavGPS switches to the Time/Date entry screen. This is the last initialization screen.



### SONAR MENU - PAGE 7 - FISH I.D. OFF

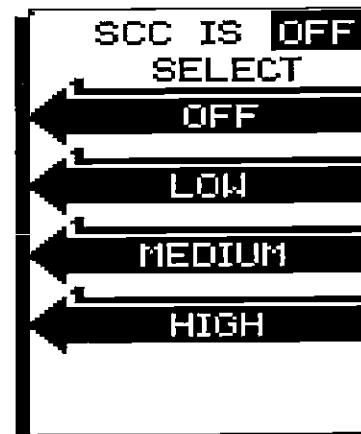
#### SURFACE CLARITY CONTROL - SCC

The markings extending downwards from the zero line can extend many feet below the surface. These markings are called surface clutter and are caused by wave action, boat wakes, temperature inversion, and more.



Surface Clarity Control, or SCC reduces or eliminates undesired signals from the display. SCC varies the sensitivity of the receiver, decreasing it near the surface and gradually increasing it as the range increases. Typically, the maximum depth that SCC affects is 75% of the range. For example, on a 0-60 foot range with maximum SCC, surface clutter would be reduced to approximately 45 feet.

There are three levels of SCC available when the Fish I.D. feature is off: low, medium, and high. When the Fish I.D. feature is on, the SCC is not adjustable and this menu doesn't show on the display.



To adjust the SCC, make certain the Fish I.D. feature is off, then press the MENU key seven times. Now press the key adjacent to the "SET CHART SURFACE CLARITY" label. Finally, press the key adjacent to the desired SCC level. The unit will return to the chart, using the level of SCC you chose.

## MENU - PAGE 8

### DISPLAY ZONE BAR

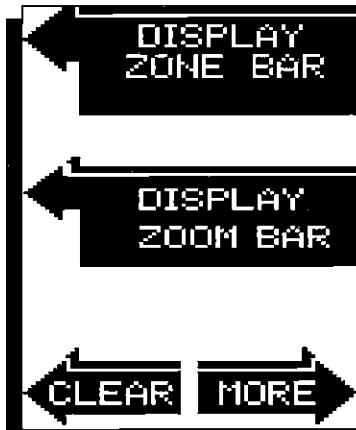
The bar used in the zone alarm normally disappears after the alarm is set. It can be turned on continuously, if desired. To turn the zone alarm bar on, press the menu key eight times. Now press the key adjacent to the "DISPLAY ZONE BAR" label. The menu screen disappears and the zone alarm bar displays on the right side of the screen. This will also turn the zone alarm on if it wasn't already on. Repeat these steps to turn the zone alarm bar off. Turning it off also turns the zone alarm off.



## MENU - PAGE 8

### DISPLAY ZOOM BAR

When the UltraNavGPS is in the manual mode, the Zoom Bar can be turned on continuously. To do so, first make certain the UltraNavGPS is in the manual mode, then press the MENU key eight times. Now press the key adjacent to the "Display Zoom Bar" label. Note: The zoom bar only shows in the Split Zoom mode.



## GETTING STARTED

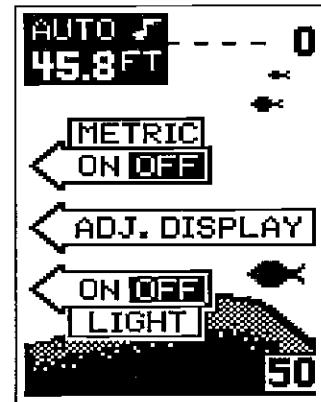
### Initialization - Power On

The UltraNavGPS must be initialized or "told where it is" the first time it's turned on. This initialization process is usually done only once and requires the following data:

1. Present position in latitude/longitude
2. Elevation above sea level (altitude)
3. Today's date and time

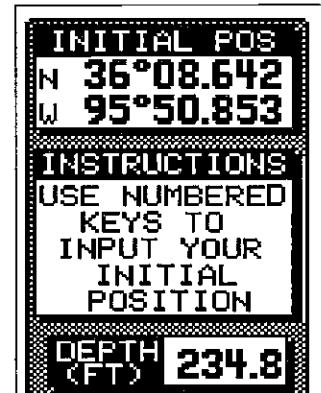
**NOTICE! DON'T INITIALIZE THE UNIT WHILE THE ULTRANAVGPS'S GPS SIMULATOR IS ON!**

After the power cable and GPS antenna module are installed, press the ON key. The screen shown at right appears. To switch the unit into the metric mode (Altitude and depth in meters, distance in nautical miles, speed in knots), press the key adjacent to the "Metric On" label. To adjust the display contrast, press the key adjacent to the "Adj Display" label. A new menu appears, letting you use the keys on the left side of the screen to adjust the contrast. To keep the display and keyboard lights on, press the key adjacent to the "Lamp On" label. To remove this menu, simply press the "CLEAR" key. Now press the GPS key. The screen shown below appears next.



### Initial Position Screen

This is the Initial Position Screen. Use the numbered keys to enter your present position in latitude/longitude. Use a chart to determine your position if you don't know it. This doesn't have to be extremely accurate. Typically, if you enter a position within one degree of your present position, the UltraNavGPS should be able to quickly find your actual latitude/longitude. Use the CLEAR key as a backspace if you make a mistake. In other words, pressing the CLEAR key erases the last number entered. Notice that the position entered is in degrees, minutes, and hundredths of a minute. (Not seconds!) After you've entered the last number, the screen shown at the top of the next page automatically appears.



## ACCURACY

You may have heard tales of extraordinary accuracy from GPS receivers. The DOD requires accuracy of 10 to 15 meters from the satellite system. However, only the military gets this precision. The way the military keeps us and other unauthorized people from using the more precise system is coding. In other words, the data coming from the satellites is encrypted. Civilian GPS receivers use what's known as "C/A Code." Its accuracy is intentionally worse than the military's "P Code." In this manner, civilian users worldwide can benefit from excellent position fixes. Meanwhile, the military keeps the most accurate system away from potential enemies. Theoretically, C/A code can give accurate position fixes up to 15 meters. This is more than adequate for most people.

However (as of this writing), the military isn't satisfied with C/A's potential accuracy in the hands of the world. So, it's degrading it further with what's called "Selective Availability" or SA. This is small, random errors intentionally added to the system so your accuracy will typically be within 100 meters. Of course, accuracy also depends on the angle of the satellite above the horizon, signal-to-noise ratio, the number of satellites tracked at one time (the more the better), and other factors. The smallest ranges on the plotter may not be usable if the SA is high, because the position will move off the screen even while you're sitting still.

Don't let this discourage you, however. GPS by nature has much faster updates than other systems (such as Loran), and typically is much easier to use. Accuracy, even with SA on is still better than most other navigation systems. You've purchased one of the finest navigation instruments on the market today. We hope you'll enjoy it for many years to come.

## The EAGLE GPS Module

This GPS receiver (manufactured by Rockwell) currently is used in all Eagle GPS receivers. It's small, rugged, and fast. The five channel design lets it acquire and track up to five satellites at one time. It transmits position information to the UltraNavGPS once every second. By incorporating Rockwell's GPS receiver technology with Eagle's state-of-the-art design and manufacturing capabilities, Eagle brings to the consumer the most advanced line of GPS marine navigation systems available in the world.

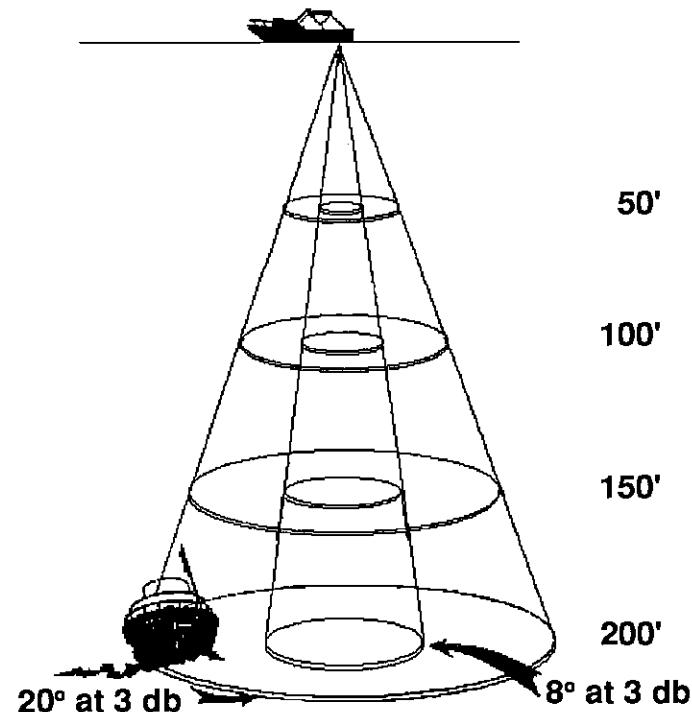


## TRANSDUCER CONE ANGLES

The sound waves from the transducer spread out into the water in a cone shaped beam. This looks much like the beam from a flashlight. The angle between the outside edges of the cone is the cone angle.

Eagle offers a choice of transducers with either an 8 or 20 degree cone angle. The transducer supplied with the UltraNavGPS has a 20 degree cone angle. Typically, wide cone angle transducers (20 degrees) are ideal for operating in shallow to medium water depths. The 20 degree cone angle allows you to see more of the underwater world. In 15 feet of water the 20 degree cone covers an area about six feet across. The 8 degree transducer covers only about a two foot circle.

The 20 degree transducer is almost always the best to use in fresh water, the 8 degree mostly in salt water. In a deep water environment, (300 feet - fresh water, 100 feet - salt water) the narrow cone angle is more desirable. Since the sound energy is concentrated in a smaller area, it can penetrate to much deeper depths.



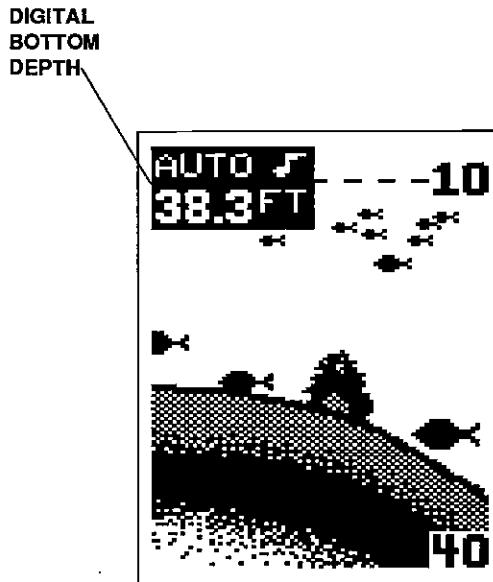
Both 8 degree and 20 degree transducers give accurate bottom readings, even though the bottom signal is much wider on the 20 degree model. This is because you are seeing more of the bottom. Remember, the shallow edge of the signal shows you the true depth. The rest of the signal tells you whether you are over rocks, mud, etc.

## SIGNAL INTERPRETATION

Your UltraNavGPS gives an accurate picture of the bottom that your boat is passing. A bottom of firm sand, gravel, shell, or hard clay returns a fairly wide signal. If the automatic mode is off and the signal narrows down, then it means that you have moved over a mud bottom. Mud absorbs the sound wave and returns a weak signal. Turn up the sensitivity to see a better bottom signal.

Big rocks or stumps on a smooth bottom send back signals above the bottom level signal. The height of the signal depends on the target's height. As you pass over a post, it should be clearly visible as a short line extending above the bottom signal.

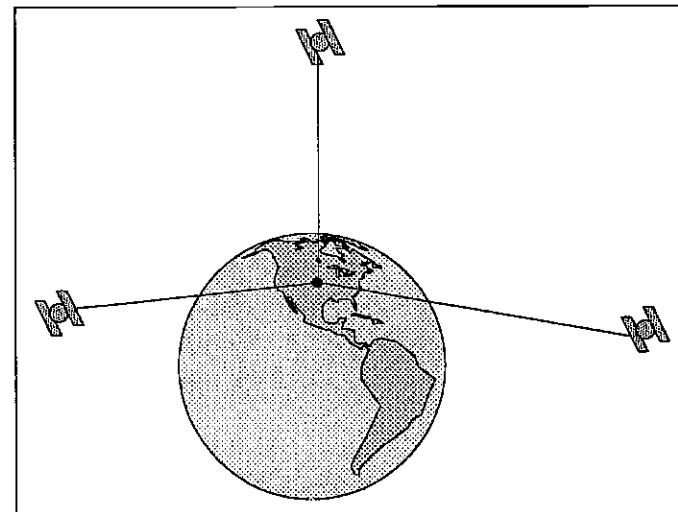
A steep slope returns a wide signal, the steeper the wider. Signals returned from a high underwater cliff are usually the widest of all.



## GPS - HOW IT WORKS

The Global Positioning System (GPS) is the newest, most high-tech approach to navigation yet devised. Conceived by the Department of Defense (DOD) and the United States military, the GPS system is an answer to their needs of 24 hour global positioning, 365 days a year.

Basically, the system works by using a constellation of satellites orbiting Earth 11,000 miles in space. There will be 21 satellites in orbit when the system is fully operational. Three more satellites will act as spares, for a total of 24. When all satellites are in place, at least four of them will be in view nearly anywhere on Earth twenty four hours a day. The GPS receiver requires at least three satellites to give a "2D" fix. (A 2D fix is your position in latitude/longitude. A 3D fix is your latitude/longitude plus altitude.) When it locks on to at least four satellites, it displays a 3D fix.



It takes three satellites to determine position.

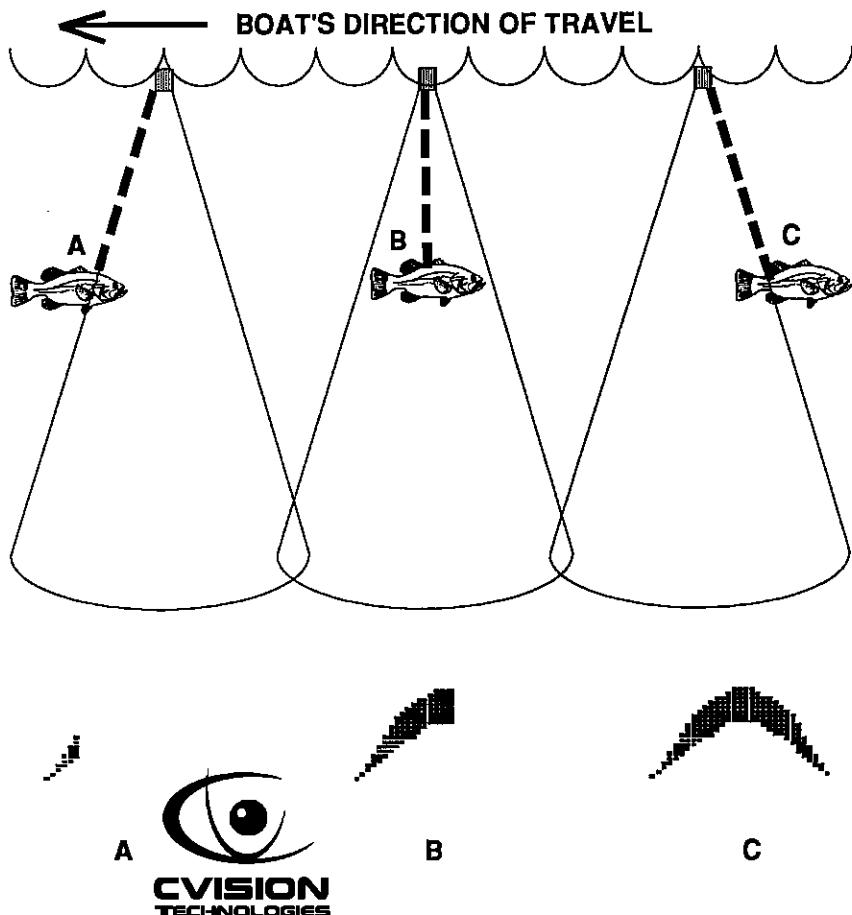
As the receiver locks on to each satellite, it calculates the distance from the satellite by measuring the length of time it takes the radio signal to reach it. Each satellite has an extremely accurate clock which tells the receiver when the radio transmission started. The receiver compares that time against its own clock, thus it knows how long it took the radio signal (travelling at the speed of light!) to reach it. If you know time and speed, then you can calculate distance. Once you have this from three satellites, then the receiver can determine position.

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## FISH ARCHES

Fish arches are created when the cone of sound passes over a fish. The distance to a fish when the cone first strikes it is shown as "A" below. When the center of the cone strikes the fish, the distance is shorter as shown "B". As the cone leaves the fish, the distance increases again as shown in "C".



A  
CVISION  
TECHNOLOGIES

When the Fish I.D. mode is off, the depth of the water will affect the size and shape of the fish arch due to the cone angle diameter. For example, if the cone passes over a fish in shallow water, the signal displayed on the UltraNavGPS may not arch at all. This is due to the narrow cone diameter and the resolution limitations of the display.

Very small fish probably will not arch at all. Medium sized fish will show a partial arch, or a shape similar to an arch if they're in deep water. Large fish will arch, but turn the sensitivity up in deeper water to see the arch. Because of water conditions, such as heavy surface clutter, thermoclines, etc., the sensitivity sometimes cannot be increased enough to get fish arches.

One of the best ways to get fish arches is to expand or "zoom" a segment of the water. For example, from 45 to 60 feet. The smaller the segment, the better the screen resolution will be. The easiest way to do this on the UltraNavGPS is with the Bottom Track feature. Use the 2x or 4x Bottom Track mode to expand the echoes, making it easier to see detail. For the best results, turn the sensitivity up as high as possible without getting too much noise on the screen. In medium to deep water, this method should work to display fish arches.

If you see fish signals when the unit is in the manual mode, but don't get fish symbols when the Fish I.D. feature is on, try increasing the sensitivity.

# ULTRANAVGPS GPS OPERATION

## **WARNING!**

USE THIS GPS RECEIVER ONLY AS AN AID TO NAVIGATION. A CAREFUL NAVIGATOR NEVER RELIES ON ONLY ONE METHOD TO OBTAIN POSITION INFORMATION.

## **CAUTION**

This GPS receiver, (like all GPS navigation equipment) will show the shortest, most direct path to a waypoint. It provides navigation data to the waypoint regardless of obstructions. Therefore, the prudent navigator will not only take advantage of all available navigation tools when travelling to a waypoint, but will also visually check to make certain a clear, safe path to the waypoint is always available.

## **NOTICE!**

As of this writing, the Department of Defense (DOD) has not declared the GPS navigation system as operational. The system is still in a testing phase. Satellites can be turned off or accuracy can be degraded at will by the system operators. Remember that the UltraNavGPS, or any GPS receiver is only as accurate as the system it's using.

# IMPORTANT SERVICE INFORMATION!

If your unit is not working, or if you need technical help, please use the following troubleshooting section before contacting a service center or the factory customer service department. It may save you the trouble of returning your unit.

## SONAR TROUBLESHOOTING

### Unit won't turn on:

1. Check the power cable's connection at the unit. Also check the wiring.
2. Make certain the power cable is wired properly. The red wire connects to the positive battery terminal, black to negative or ground.
3. Check the fuse.
4. Measure the battery voltage at the unit's power connector. It should be at least 11 volts. If it isn't, the wiring to the unit is defective, the battery terminals or wiring on the terminals are corroded, or the battery needs charging.

### Unit freezes, locks up, or operates erratically:

1. Electrical noise from the boat's motor, trolling motor, or an accessory may be interfering with the sonar unit. Re-routing the power and transducer cables away from other electrical wiring on the boat may help. Route the sonar unit's power cable directly to the battery instead of through a fuse block or ignition switch.
2. Inspect the transducer cable for breaks, cuts, or pinched wires.
3. Check both the transducer and power connectors. Make certain both are securely plugged in to the unit.

### Weak bottom echo, digital readings erratic, or no fish signals:

1. Make certain transducer is pointing straight down. Clean the face of the transducer. Oil, dirt, and fuel can cause a film to form on the transducer, reducing its effectiveness. If the transducer is mounted inside the hull, be sure it is shooting through only one layer of fiberglass and that it is securely bonded to the hull. Do NOT use RTV silicone rubber adhesive or Marinetex™.

#### **Weak bottom echo, digital readings erratic, or no fish signals (cont.):**

2. Electrical noise from the boat's motor can interfere with the sonar. This causes the sonar to automatically increase its Discrimination or noise rejection feature. This can cause the unit to eliminate weaker signals such as fish or even structure from the display.
3. The water may be deeper than the sonar's ability to find the bottom. If the sonar can't find the bottom signal while it's in the automatic mode, the digital will flash continuously. It may change the range to limits far greater than the water you are in. If this happens, place the unit in the manual mode, then change the range to a realistic one, (for example, 0-100 feet) and increase the sensitivity. As you move into shallower water, a bottom signal should appear.
4. Check the battery voltage. If the voltage drops, the unit's transmitter power also drops, reducing its ability to find the bottom or targets.

#### **Bottom echo disappears at high speeds or erratic digital reading or weak bottom echo while boat is moving**

1. The transducer may be in turbulent water. It must be mounted in a smooth flow of water in order for the sonar to work at all boat speeds. Air bubbles in the water disrupt the sonar signals, interfering with its ability to find the bottom or other targets. The technical term for this is 'Cavitation'.
2. Electrical noise from the boat's motor can interfere with the sonar. This causes the sonar to automatically increase its Discrimination or noise rejection feature. This can cause the unit to eliminate weaker signals such as fish or even structure from the display. Try using resistor spark plugs or routing the sonar unit's power and transducer cables away from other electrical wiring on the boat.

#### **No fish arches when the Fish ID feature is off:**

1. Make certain transducer is pointing straight down. This is the most common problem if a partial arch is displayed. See the Fish Arch section in your owner's manual for more information.
2. The sensitivity may not be high enough. In order for the unit to display a fish arch, it has to be able to receive the fish's echo from the time it enters the cone until it leaves. If the sensitivity is not high enough, the unit displays the fish only when it is in the center of the cone.
3. Use the Zoom feature. It is much easier to display fish arches when zoomed in on a small range of water than a large one. For example, you will have much better luck seeing fish arches with a 30 to 60 foot range than a 0 to 60 foot range. This enlarges the targets, allowing the display to show much more detail.

4. The boat must be moving at a slow trolling speed to see fish arches. If the boat is motionless, fish stay in the cone, showing on the display as straight horizontal lines.

#### **ELECTRICAL NOISE**

A major cause of sonar problems is electrical noise. This usually appears on the sonar's display as random patterns of dots or lines. In severe cases, it can completely cover the screen with black dots, or cause the unit operate erratically, or not at all.

To eliminate or minimize the effects of electrical noise, first try to determine the cause. With the boat at rest in the water, the first thing you should do is turn all electrical equipment on the boat off. Make certain the engine is off, also. Turn on your sonar unit, then turn ASP (Advanced Signal Processing) off. There should be a steady bottom signal on the display. Now turn on each piece of electrical equipment on the boat and view the effect on the sonar's display. For example, turn on the bilge pump and view the sonar display for noise. If no noise is present, turn the pump off, then turn on the VHF radio and transmit. Keep doing this until all electrical equipment has been turned on, their effect on the sonar display noted, then turned off.

If you find noise interference from an electrical instrument, trolling motor, pump, or radio, try to isolate the problem. You can usually re-route the sonar unit's power cable and transducer cable away from the wiring that is causing the interference. VHF radio antenna cables radiate noise when transmitting, so be certain to keep the sonar's wires away from it. You may need to route the sonar unit's power cable directly to the battery to isolate it from other wiring on the boat.

If no noise displays on the sonar unit from electrical equipment, then make certain everything except the sonar unit is turned off, then start the engine. Increase the RPM with the gearshift in neutral. If noise appears on the display, the problem could be one of three things; spark plugs, alternator, or tachometer wiring. Try using resistor spark plugs, alternator filters, or routing the sonar unit's power cable away from engine wiring. Again, routing the power cable directly to the battery helps eliminate noise problems. Make certain to use the in-line fuse supplied with the unit when wiring the power cable to the battery.

When no noise appears on the sonar unit after all of the above tests, then the noise source is probably cavitation. Many novices or persons with limited experience make hasty sonar installations which function perfectly in shallow water, or when the boat is at rest. In nearly all cases, the cause of the malfunction will be the location and/or angle of the transducer. The face of the transducer must be placed in a location that has a smooth flow of water at all boat speeds. Read your transducer owner's manual for the best mounting position.